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EMOTION DYSREGULATION, SELF- IMAGE, AND EATING DISORDERS

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Emotion dysregulation, self-image, and eating disorders

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To my family

POPULAR SCIENCE SUMMARY OF THE THESIS

Eating disorders (EDs) are severe psychiatric disorders characterized by both cognitive and behavioral symptoms. Cognitive symptoms include anxious preoccupation with food, shape, and weight, and that these issues often determine one's sense of self-worth. Behavioral symptoms include disturbed eating patterns such as restriction, fasting, and/or binge-eating, as well as various efforts to control weight and caloric intake such as self-induced vomiting and compulsive exercise. EDs are associated with significant distress, and symptoms often interfere with other areas of life. Treatment is effective for most who suffer from EDs eventually, but even after recovery, many continue to have considerable ED symptoms along with a reduced psychological well-being. There are no simple and definite answers to why EDs are developed, of which factors that may contribute to keeping individuals ill, or as to what factors that contribute to swift and stable recovery. Psychological, biological, genetic, and cultural factors likely all contribute. This thesis focuses on two psychological traits that may be implicated in ED development, maintenance, and outcome, namely emotion dysregulation and self-image.

Emotion dysregulation refers to difficulties in understanding, accepting, and managing one's emotions, particularly one's negative emotions. Self-image refers to the way one habitually evaluates, talks to, and behaves towards oneself internally, for instance if one tends to care, protect, and accept oneself, or rather blame, attack, and neglect oneself. These traits are influential for overall mental health as well as in various psychiatric disorders, including EDs. Higher emotion dysregulation and more negative self-image seem to be more common in those suffering from EDs than in comparison groups. ED symptoms are also described as strategies to manage negative emotions in the short-term, and ED symptoms could represent ways of trying to harshly control or attack oneself. These factors may also affect ED outcomes. However, it is not clear if there are specific aspects of emotion dysregulation that may be more influential than others for whether one has an ED or not, for which kind of ED one has, or for specific ED symptoms. Also, it is not clear if emotion dysregulation and self-image are equally influential in relation to symptoms, or if there are specific patterns in how they may influence symptoms and outcome. Such knowledge could help indicate risk factors for EDs that may be important to strengthen for ED prevention; which traits that may be particularly important to work with in treatment to improve outcome; and if either emotion dysregulation or self-image may be of greater importance to address in treatment.

This thesis examined these questions in 999 patients with EDs who presented to Swedish ED treatment units and in 252 female university students in four specific studies. The participants rated their present abilities in understanding, accepting, and managing their emotions, their self-image, and their levels of cognitive and behavioral ED symptoms. Patients rated these aspects when they came to treatment units prior to starting treatment. For 307 patients, data on these factors and if they still had an ED after one year in treatment were also available.

Results indicated that participants with EDs rated higher levels of emotion dysregulation than comparison participants, particularly higher difficulties in being aware of, and understanding,

one's emotions. Patients with different EDs did not differ much from each other, indicating that emotion dysregulation may be just as problematic in all EDs. Feeling that one does not have any good ways to manage distress and negative emotions was particularly related to higher dietary restraint and higher levels of concerns with food, shape, and weight. Difficulties being in control over one's behavior when upset and difficulties accepting one's negative emotions were related to binge-eating. Ratings of emotion dysregulation prior to treatment could not predict one-year outcome very well but change in emotion dysregulation over one year was related to outcome. Less improvement, or even worsening, in emotion regulation was associated with less favorable outcomes. However, when self-image was examined alongside emotion dysregulation in relation to ED symptoms and outcome, a clear pattern emerged that highlighted the importance of self-image. Specifically, higher emotion dysregulation was only indirectly associated with higher ED psychopathology, through more negative self-image. This pattern was evident in both participants with EDs and in the comparison participants. Similarly, less emotion dysregulation improvement was only indirectly associated with less ED psychopathology improvement through less self-image improvement.

This pattern suggests that more difficulties in understanding, accepting, and managing one's emotions indicate more self-blame, -attack, and -neglect and less self-love, -protection, and acceptance, and that, in turn indicate higher efforts of dietary restraint and more concerns with food, shape, and weight. That is, presence of higher emotion dysregulation alone may not indicate higher ED psychopathology, but emotion dysregulation "channeled through" the negative and habitual way one evaluates and behaves towards oneself (i.e., self-image) does so. Thus, although results in this thesis confirm that emotion dysregulation seems implicated in EDs, and therefore likely needs to be addressed in treatment, results particularly highlight the importance of also addressing self-image when doing so. That is, helping patients to respond to themselves with acceptance and protection rather than harsh blame and neglect, even when they experience unwanted, undifferentiated, and 'unmanageable' emotions, may provide them with necessary tools for reducing ED symptoms. Improving emotion regulation and self-image could also be relevant for ED prevention. Additionally, being able to more compassionately and non-judgmentally attend to one's potential underlying vulnerabilities, and taking better care of one's psychological needs, may entail less severe consequences of such vulnerabilities. Therefore, helping patients to increase their emotion regulation abilities and improving self-image, may also improve overall mental health, reduce psychological vulnerability, and reduce the risk of ED relapse, although this remains to be examined.

POPULÄRVETENSKAPLIG SAMMANFATTNING

Ätstörningar är allvarliga psykiatriska sjukdomar som karaktäriseras av både kognitiva och beteendemässiga symptom. De kognitiva symptomen innefattar ångestdriven upptagenhet av ätande, figur och vikt, och att dessa områden i stor utsträckning påverkar ens självkänsla. De beteendemässiga symptomen innefattar restriktivt ätande, fastande och hetsätande liksom olika sätt att försöka kontrollera kaloriintag och vikt, såsom självframkallade kräkningar och tvångsmässig träning. Ätstörningar är förknippade med betydande psykiskt lidande och symptomen stör ofta andra områden i livet. Behandling är oftast effektiv i längden för merparten drabbade, men även efter tillfrisknande kan många fortsätta att ha betydande ätstörningssymptom och lägre psykiskt välbefinnande. Det finns inga enkla och definitiva svar på vad som orsakar ätstörningar, vilka faktorer som vidmakthåller dem eller vilka faktorer som bidrar till ett snabbt och stabilt tillfrisknande. Antagligen bidrar psykologiska, biologiska och genetiska faktorer, liksom kulturella och sociala aspekter i samhället. Den här avhandlingen fokuserar på två psykologiska drag, (bristande) emotionsreglering och självbild, som båda kan vara betydelsefulla vid både uppkomst, vidmakthållande och utfall vid ätstörningar.

Bristande emotionsreglering avser svårigheter i att förstå, acceptera och hantera sina känslor, och då särskilt negativa känslor. Självbild avser det sätt man vanemässigt bedömer, pratar till och inombords betar sig gentemot sig själv, exempelvis om man tenderar att bry sig om, skydda och acceptera sig själv, eller snarare tenderar att klandra, attackera och försumma sig själv. Dessa drag är båda viktiga för hur man generellt mår rent psykiskt och de är även viktiga i relation till olika psykiatriska sjukdomar, inklusive ätstörningar. Det verkar vara vanligare med större svårigheter med emotionsreglering och mer negativ självbild bland ätstörningsgrupper jämfört med friska grupper. Ätstörningssymptomen i sig kan vara sätt att kortsiktigt försöka hantera sina känslor, och de kan också ses som konkreta sätt att hårt och negativt försöka kontrollera, eller rent av attackera, sig själv. Det är dock inte helt klart ifall särskilda aspekter av bristande emotionsreglering är av större betydelse för om man är sjuk i ätstörning eller inte, för vilken typ av ätstörning man har, eller i relation till specifika symptom. Det är inte heller tydligt ifall bristande emotionsreglering och negativ självbild är lika betydelsefulla i relation till symptomen eller om det finns särskilda mönster i hur de möjligtvis påverkar symptom och utfall. Sådan kunskap kan bidra till att identifiera möjliga riskfaktorer för ätstörningar som därmed kan vara viktiga att förbättra i förebyggande arbete, vilka faktorer som kan vara särskilt viktiga att arbeta med i ätstörningsbehandling för att förbättra utfall, samt vilken av emotionsreglering och självbild som kan vara av större betydelse att påverka i behandling.

Den här avhandlingen undersökte dessa frågor genom fyra delstudier som innehöll data från 999 kvinnor med ätstörningar som sökt svensk specialiserad ätstörningsvård och 252 kvinnliga universitetsstudenter. Deltagarna skattade sina nuvarande förmågor att förstå, acceptera och hantera sina negativa känslor, sin självbild och sina nuvarande ätstörningssymptom. Deltagarna med ätstörning skattade dessa faktorer när de kommit till mottagningarna för bedömning inför behandling; 307 patienter hade också skattningar av dessa faktorer efter ett år i behandling liksom data på ifall de hade blivit friska eller inte.

Resultaten i avhandlingen visade att deltagare med ätstörning generellt hade större svårigheter med emotionsreglering jämfört med studentgruppen, särskilt svårigheter att uppmärksamma och förstå sina känslor. Olika aspekter av bristande emotionsreglering verkade däremot inte skilja sig åt mellan deltagare med olika ätstörningsdiagnoser, vilket indikerar att emotionsreglering är lika svårt oavsett diagnos. Att känna att man inte har några bra strategier att hantera sina negativa känslor var av särskild betydelse i relation till försök att begränsa sitt matintag och negativ upptagenhet av ätande, figur och vikt. Svårigheter att kontrollera sitt beteende när man är upprörd och svårigheter att acceptera sina negativa känslor var av särskild betydelse för förekomst av hetsätning. Hur man skattade sin förmåga till emotionsreglering vid behandlingsstart verkade inte kunna säga så mycket om sannolikt utfall efter ett år, men däremot var förändring i emotionsreglering över ett år relaterat till utfall. Lägre grad av förbättring, eller till och med försämring, i emotionsreglering var relaterat till mindre gynnsamma utfall. Dock visade det sig att när både självbild och bristande emotionsreglering undersöktes i förhållande till ätstörningssymptom och utfall, så framträdde ett tydligt mönster som särskilt betonade betydelsen av självbild. Mer ingående så var större svårigheter med emotionsreglering bara indirekt relaterad till högre kognitiva ätstörningssymptom, genom mer negativ självbild. Detta mönster visade sig bland både deltagare med ätstörning och studentgruppen. På ett liknande sätt var lägre grad av förbättring av emotionsreglering bara indirekt relaterat till lägre grad av förbättring av ätstörningssymptom genom lägre grad av förbättring i självbild.

Det här mönstret antyder att större svårigheter i att förstå, acceptera och hantera sina (negativa) känslor indikerar högre benägenhet att klandra, attackera och försumma sig själv och lägre benägenhet att bry sig om, skydda och acceptera sig själv, vilket i sin tur indikerar högre benägenhet att försöka begränsa sitt matintag och mer negativ upptagenhet av ätande, figur och vikt. Det vill säga, förekomst av bristande emotionsreglering i sig kanske inte indikerar en högre grad av ätstörningssymptom, men bristande emotionsreglering "kanaliserad genom" det negativa sätt man vanemässigt bedömer och behandlar sig själv tycks göra det. Därmed indikerar resultaten att även om emotionsreglering tycks vara relevant för ätstörningar, och därmed behöver tas upp i behandling, så framhålls i synnerhet vikten av att även rikta fokus mot självbilden när man gör det. Det vill säga, att hjälpa patienter att relatera till sig själva med mer av acceptans och omhändertagande snarare än hård och negativ kontroll och försummelse, även när man upplever känslor som känns oönskade, otydliga och svåra att hantera, kan ge patienter ökade möjligheter att kunna reducera sina ätstörningssymptom. Att förbättra emotionsreglering och självbild kan även vara relevant för att förebygga ätstörningar. En ökad förmåga att på ett mer medkännande och icke-dömande sätt vara uppmärksam på sårbarheter man kanske har, och att ta bättre hand om sina psykologiska behov, skulle därutöver potentiellt kunna ge mindre problematiska konsekvenser av dessa sårbarheter. På så sätt skulle en ökad förmåga till emotionsreglering och förbättrad självbild eventuellt kunna förbättra patienters allmänna psykiska välmående, reducera eventuell psykologisk sårbarhet, och minska risken för återfall i ätstörning, även om detta behöver undersökas i framtida studier.

ABSTRACT

Background: Eating disorders (EDs) are complex psychiatric disorders that entail great suffering, high prevalence of comorbid psychiatric and somatic conditions, and increased mortality. The understanding of how EDs develop and are maintained is unclear, although emotion- and self-related themes are highlighted in several theoretical models of EDs. This thesis focuses on two psychological traits in relation to EDs: emotion dysregulation (difficulties in understanding and managing one's emotions) and self-image (habitual self-directed evaluations and behaviors). Higher emotion dysregulation and more negative self-image may differentiate those suffering from EDs from controls, and independently, both concepts are associated with ED symptom severity and outcome. However, previous studies have generally been conducted in smaller samples and/or with only some ED diagnoses represented, and the impact of specific aspects of emotion dysregulation on symptoms remains unclear. Also, no prior research has concurrently examined both emotion dysregulation and self-image in relation to ED psychopathology and outcome in order to clarify potential pathways whereby these traits affect each other in relation to symptoms. Doing so could present an opportunity to integrate models, disentangle association pathways, and increase specificity.

Aims: This thesis aimed to examine aspects of emotion dysregulation in relation to diagnostic presentation, specific ED symptoms, and ED outcome. It also aimed to examine direct and indirect associations between emotion dysregulation, self-image, and ED psychopathology, in ways that may inform both risk and potentially pathology-specific maintenance models. Lastly, it aimed to clarify if, and in that case how, these concepts may impact on ED outcome.

Methods: Participants were patients with a range of EDs presenting to specialized ED treatment units (**Studies I and III:** $N=999$; **Study IV:** $N=307$) and comparison participants (female university students; **Studies I and II:** $N=252$). Emotion dysregulation was measured by the Difficulties in Emotion Regulation Scale (DERS), self-image by the Structural Analysis of Social Behavior (SASB), and ED symptoms by the Eating Disorder Examination Questionnaire (EDE-Q). **Study I** examined differences in DERS between patients and the comparison group, and between patients with different EDs. It also examined unique associations between DERS subscales and ED psychopathology and behavioral symptoms. **Study II** examined direct and indirect associations between emotion dysregulation, self-image, and ED symptoms in the comparison group using mediation analysis. **Study III** aimed to replicate the main **Study II** findings, and additional analyses extended previous work by exploring direct and indirect associations using particular emotion dysregulation dimensions and distinct self-image aspects. **Study IV** examined if initial DERS, or one-year change in DERS, could predict ED outcome in a subset of patients with complete follow-up data using multiple regression. It also examined pathways whereby change in emotion dysregulation and self-image might influence change in ED psychopathology over one year using mediation analysis.

Results: Patients generally reported higher emotion dysregulation than the comparison group, but emotion dysregulation generally did not differ between diagnoses. Higher perceived lack of emotion regulation strategies was uniquely associated with ED psychopathology in both

patients and comparison participants. In patients, higher difficulties in impulse control and emotional non-acceptance showed unique associations with binge-eating, while lower difficulties in goal-directed behavior was associated with compulsive exercise. Emotion dysregulation was strongly associated with negative self-image in both comparison participants and patients. When examined concurrently in relation to ED psychopathology, emotion dysregulation was only indirectly associated with symptoms through self-image. More fine-grained analyses in patients with and without binge-eating characterized by loss of control, respectively, showed differentiating indirect effects through specific self-image aspects. Initial emotion dysregulation only weakly predicted ED outcome, while less improvement (or worsening) in emotion dysregulation was strongly associated with both higher follow-up ED psychopathology and an increased risk of still having an ED, even when initial severity was taken into consideration. Lastly, less emotion dysregulation improvement only was indirectly associated with less ED psychopathology improvement, through less self-image improvement.

Conclusions: Emotion dysregulation seems to differentiate individuals suffering from EDs from comparison groups but generally not diagnoses from each other, indicating emotion dysregulation as a potential transdiagnostic risk factor. Although both emotion dysregulation and self-image independently may function as maintenance factors for ED psychopathology and mechanisms of change in relation to better ED outcomes, results from mediation analyses particularly suggest self-image as the influential factor whereby emotion dysregulation influences ED psychopathology. Thus, although results confirm considerable associations between emotion dysregulation and symptoms that would benefit from clinical attention, they particularly highlight the importance of addressing self-image when doing so. That is, helping patients to respond to themselves with acceptance and protection rather than harsh blame and neglect, even in the presence of unwanted, undifferentiated, and ‘unmanageable’ emotions, may provide patients with necessary tools for reducing ED symptoms.

LIST OF SCIENTIFIC PAPERS

- I. Monell, E., Clinton, D., & Birgegård, A. (2018). Emotion dysregulation and eating disorders – Associations with diagnostic presentation and key symptoms. *International Journal of Eating Disorders*, 51(8), 921-930. doi:10.1002/eat.22925
- II. Monell, E., Högdahl, L., Forsén Mantilla, E., & Birgegård, A. (2015). Emotion dysregulation, self-image and eating disorder symptoms in University Women. *Journal of Eating Disorders*, 3:44. doi:10.1186/s40337-015-0083-x
- III. Monell, E., Clinton, D., & Birgegård, A. (2020). Self-directed behaviors differentially explain associations between emotion dysregulation and eating disorder psychopathology in patients with or without objective binge-eating. *Journal of Eating Disorders*, 8:17. doi:10.1186/s40337-020-00294-4
- IV. Monell, E., Clinton, D., & Birgegård, A. (2021). Emotion dysregulation and eating disorder outcome: prediction, change and contribution of self-image. *Manuscript in preparation*

SCIENTIFIC PAPERS NOT INCLUDED IN THE THESIS

- I. Monell, E., Levallius, J., Forsén Mantilla, E., & Birgegård, A. (2018). Running on empty – a nationwide large-scale examination of compulsive exercise in eating disorders. *Journal of Eating Disorders*, 6:11. doi:10.1186/s40337-018-0197-z
- II. Nordgren, L., Monell, E., Birgegård, A., Bjureberg, J., & Hesser, H. (2020). Factor Structure of the Difficulties in Emotion Regulation Scale in Treatment Seeking Adults with Eating Disorders. *Journal of Psychopathology and Behavioral Assessment*, 42, 111-126. doi:10.1007/s10862-019-09765-8
- III. Rania, M.*, Monell, E.*, Sjölander, A., & Bulik, C. M. (2020). Emotion dysregulation and suicidality in eating disorders. *International Journal of Eating Disorders*. Advance online publication. doi:10.1002/eat.23410
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- IV. Monell, E., Nordgren, L., Hesser, H., Birgegård, A., & Bjureberg, J. (2021). Factor structure and clinical correlates of the original and short-form of the Difficulties in Emotion Regulation Scale in adolescents with eating disorders. *Manuscript submitted for publication*

CONTENTS

1	INTRODUCTION.....	1
2	LITERATURE REVIEW.....	3
	2.1 EATING DISORDERS (EDs).....	3
	2.1.1 Definition and classification of EDs.....	3
	2.1.2 Epidemiology, course, and outcome of EDs	4
	2.1.3 Treatment of EDs	5
	2.1.4 ED etiology and maintenance	6
	2.2 SOCIO-EMOTIONAL DEVELOPMENT	7
	2.3 EMOTION-RELATED THEMES IN EDS	8
	2.3.1 Emotion dysregulation and the Difficulties in Emotion Regulation Scale.....	9
	2.3.2 Aspects of emotion dysregulation and associations with ED symptoms.....	10
	2.3.3 Emotion dysregulation and associations with ED outcome.....	11
	2.4 SELF-RELATED THEMES IN EDS.....	12
	2.4.1 Self-image and the Structural Analysis of Social Behavior.....	12
	2.4.2 Self-image and associations with eating disorder symptoms.....	14
	2.4.3 Self-image and associations with eating disorder outcome	14
	2.5 EMOTION DYSREGULATION, SELF-IMAGE, AND EDS	15
	2.5.1 Examining associations between emotion dysregulation, self-image, and ED psychopathology	16
	2.6 SUMMARY	16
3	RESEARCH AIMS	19
4	MATERIALS AND METHODS.....	21
	4.1 OVERALL METHODOLOGY.....	21
	4.2 PARTICIPANTS.....	21
	4.2.1 The Stepwise registry.....	21
	4.2.2 The clinical sample	22
	4.2.3 The comparison sample	23
	4.3 MEASURES.....	24
	4.3.1 The Difficulties in Emotion Regulation Scale.....	24
	4.3.2 The Eating Disorder Examination Questionnaire	24
	4.3.3 The Structural Analysis of Social Behavior	25
	4.3.4 Additional measures.....	26
	4.4 STATISTICAL ANALYSES	27
	4.4.1 Mediation model	27
	4.4.2 Statistical analysis by study	28
	4.4.3 Clinical sample representativeness	30
	4.5 ETHICAL CONSIDERATIONS.....	32
5	RESULTS.....	33
	5.1 STUDY I.....	33
	5.1.1 Sample characteristics.....	33
	5.1.2 Differences in emotion dysregulation.....	33
	5.1.3 Unique associations between emotion dysregulation and ED psychopathology	34
	5.1.4 Unique associations between emotion dysregulation and ED behavioral symptoms	35
	5.1.5 Conclusions	35
	5.2 STUDY II	36
	5.2.1 Correlations between emotion dysregulation, self-image, and symptoms	36
	5.2.2 Direct and indirect associations between emotion dysregulation, self- image, and ED symptoms	36
	5.2.3 Conclusions	38

5.3	STUDY III.....	38
5.3.1	Sample characteristics	38
5.3.2	Simple mediation models	39
5.3.3	Multiple parallel mediaton models in participants without OBE	39
5.3.4	Multiple parallel mediation models in participants with OBE	40
5.3.5	Conclusions.....	41
5.4	STUDY IV	42
5.4.1	Sample characteristics and one-year change in ED psychopathology, emotion dysregulation, and self-image.....	42
5.4.2	Prediction of follow-up ED psychopathology and remission.....	42
5.4.3	Direct and indirect associations between one-year change in emotion dysregulation, self-image, and ED psychopathology.....	43
5.4.4	Conclusions.....	44
6	DISCUSSION	45
6.1	MAIN FINDINGS	45
6.2	EMOTION DYSREGULATION IN ED SYMPTOMS AND OUTCOME.....	46
6.2.1	Emotion dysregulation as a transdiagnostic risk factor for ED symptoms.....	46
6.2.2	The role of emotion dysregulation in ED psychopathology maintenance.....	47
6.2.3	The unclear role of self-rated emotion dysregulation in behavioral symptoms	47
6.2.4	Improvement in emotion dysregulation as a mechanism of change.....	48
6.2.5	Summary of emotion dysregulation in EDs	48
6.3	SELF-IMAGE IN ED PSYCHOPATHOLOGY AND OUTCOME	49
6.3.1	The intertwinement of self-image and ED psychopathology	49
6.3.2	Self-image seems central in ED outcome	50
6.4	THE INDIRECT ASSOCIATION BETWEEN EMOTION DYSREGULATION AND ED PSYCHOPATHOLOGY THROUGH SELF-IMAGE.....	50
6.4.1	Emotion dysregulation 'channeled through' self-image may influence concurrent ED psychopathology	51
6.4.2	Pathology-specific associations.....	52
6.4.3	The importance of self-image improvement	54
6.4.4	Summary of direct and indirect associations between emotion dysregulation, self-image, and ED psychopathology.....	55
6.5	DEVELOPMENTAL CONSIDERATIONS	56
6.6	CLINICAL IMPLICATIONS.....	57
6.6.1	Explore emotions underlying symptoms through kinder self-directed behaviors	57
6.6.2	Increase emotion regulation skills through acts of self-compassion	58
6.6.3	Improve outcome through emotion regulation and self-image improvement.....	59
6.6.4	Interpersonal implications in treatment.....	60
6.6.5	Emotion regulation and self-image in ED prevention	60
6.7	STRENGTHS AND LIMITATIONS.....	60
6.7.1	Conceptual limitations	61
6.7.2	Methodological limitations.....	62
6.7.3	Statistical limitations.....	64
7	CONCLUSIONS.....	67
8	POINTS OF PERSPECTIVE	69
9	ACKNOWLEDGEMENTS.....	71
10	REFERENCES.....	73

LIST OF ABBREVIATIONS

AN	Anorexia nervosa
AN-BP	Anorexia nervosa binge/purge subtype
(M)AN(C)OVA	(Multivariate) analysis of (co)variance
AN-R	Anorexia nervosa restrictive subtype
APA	American Psychiatric Association
BED	Binge eating disorder
BMI	Body mass index
BN	Bulimia nervosa
CBT	Cognitive behavioral therapy
CBT-E	Enhanced cognitive behavioral therapy for eating disorders
CE	Compulsive exercise
CFT	Compassion Focused Therapy
CI	Confidence interval
CPRS	Comprehensive Psychopathological Rating Scale
DERS	Difficulties in Emotion Regulation Scale
DSM	Diagnostic and Statistical Manual of Mental Disorders
ED	Eating disorder
EDE-Q	Eating Disorder Examination Questionnaire
EDNOS	Eating disorder not otherwise specified
ICAT	Integrative Cognitive-Affective Treatment
IPT	Interpersonal psychotherapy
OBE	Objective binge-eating episode
OR	Odds ratio
OSFED	Other specified feeding and eating disorders
SASB	Structural Analysis of Social Behavior
SBE	Subjective binge-eating episode
SDQ	Strengths and Difficulties Questionnaire
SEDI	Structured Eating Disorder Interview
TAU	Treatment as usual
UFED	Unspecified feeding and eating disorders

1 INTRODUCTION

Eating disorders (EDs) are complex psychiatric disorders where much still remain unknown. The diagnostic criteria for EDs capture features such as preoccupation with eating, shape, and weight, and behavioral symptoms like dietary restraint, binge-eating, and various efforts of controlling shape and weight, but EDs are also accompanied by a range of other problematic traits and negative consequences. EDs commonly imply significant distress, high levels of anxiety, depressed mood, and high prevalence of comorbid psychiatric and somatic conditions, great societal costs, and increased mortality (Schaumberg et al., 2017). EDs often also disturb other areas of life such as work, school, relationships, and hobbies.

Although at least one ED (i.e., anorexia nervosa [AN]) have been known and described for centuries, the understanding of how EDs develop and are maintained is still unclear. Growing up during the turn of the millennium, I recall EDs being mentioned in the media in an almost alarmistic way, along with an abundance of pictures of emancipated female celebrities. In the information available to me, EDs were mainly mentioned as the worse consequence of dangerous beauty and body ideals in the media. It got me interested in EDs however, having also seen it close by, and from my perspective back then, it was obvious that the media and unattainable ideals for women were to blame. In contrast, the aggregated science indicates that there are not just one or a few factors that causes these disorders, that is, the media is not solely responsible. Instead, biological, genetic, psychological, and cultural factors may all contribute to the emergence and maintenance of EDs, and not only young women are at danger for developing EDs (Culbert et al., 2015; Schaumberg et al., 2017).

Just as there is no one cause, there does not seem to be just one cure. Accordingly, there are several approaches to treatment and new or adjusted treatment models are continually being developed. However, although treatments seem to be mostly effective for the majority, relapse is common, and some sufferers develop chronic illnesses (Keel et al., 2005; Keel & Brown, 2010). Additionally, many continue to have considerable ED symptoms even after recovery along with reduced psychological well-being (Tomba et al., 2019). In becoming a clinical psychologist, my interest has shifted from cultural factors such as beauty ideals to the psychological characteristics of EDs. Which psychological traits or processes can explain why individuals with EDs continue to do things to themselves that feels bad, causes pain and suffering, and that they often know are not good for them? What psychological processes, feelings, or thoughts may underlie or maintain these symptoms? And how can such knowledge improve not only ED treatment response but also overall mental health?

This thesis will examine two psychological traits, emotion dysregulation and self-image, that seem influential in EDs. These traits will be examined in relation to diagnostic presentation, specific ED symptoms, and ED outcome. The overall aim is to obtain clinically relevant knowledge of how these traits may influence ED development, maintenance, and outcome, and to hopefully suggest specific clinical implications that may improve outcome.

2 LITERATURE REVIEW

2.1 EATING DISORDERS

EDs are characterized by both behavioral and cognitive symptoms present for an extended amount of time. Sufferers are anxiously preoccupied with food, shape, and weight, and these themes most often have a significant importance for self-worth. All EDs entail notably disturbed eating patterns including restriction and binge-eating. Binge-eating refers to episodes of eating an unusually large amount of food during a discrete period of time, coupled with a sense of lack of control over one's eating. If others would agree that the food consumed is unusually large, it is classified as an objective binge-eating episode (OBE), if not, it is termed a subjective binge-eating episode (SBE). Other behavioral symptoms include various efforts to control weight and caloric intake, termed compensatory behaviors. These include fasting and purging, mainly self-induced vomiting, misuse of laxatives and/or diuretics, and compulsive exercise (CE). Depending on symptom presentation, there are specific diagnoses: AN, bulimia nervosa (BN), binge eating disorder (BED), other specified feeding and EDs (OSFED) and unspecified FED (UFED; all diagnoses explained below).

EDs are associated with significant distress, and symptoms often disturb other areas of life such as daily occupation and interpersonal relationships. Psychiatric comorbidity is very common in EDs, particularly mood and anxiety disorders, obsessive/compulsive disorder, substance abuse, and personality disorders (O'Brien & Vincent, 2003; Ulfvebrand et al., 2015). Somatic complications are also common, with many representing consequences of the behavioral symptoms. In AN, common complications include dermatologic changes, cardiovascular complications, and osteoporosis; in BN, electrolyte abnormalities and oral complications are common; and in BED, obesity and related complications (e.g., type-II diabetes, cardiovascular disease) are common (Mehler, 2011; Mitchell, 2016; Mitchell & Crow, 2006). Gastrointestinal complaints are prevalent across EDs (Wiklund, 2020; Mitchell & Crow, 2006). Lastly, mortality in EDs is elevated compared to both other psychiatric disorders and the general population with suicide accounting for 20-25% of deaths in AN and BN (Smink et al., 2012). Less is known about death by suicide in other EDs, but suicidal ideation and suicide attempts are prevalent across all ED diagnoses (Pisetsky et al., 2013; Rania et al., 2020).

2.1.1 Definition and classification of EDs

Specific ED diagnoses are defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association [APA], 2000, 2013). According to the most recent version, DSM-5 (APA, 2013), there are three main ED categories: AN, BN, and BED. AN is characterized by dietary restraint and/or behaviors that prevent weight gain (e.g., CE), significant underweight, and often intense fear of weight gain (not diagnostic criteria). If there are episodes of binge-eating and/or purging, cases are categorized into the subcategory AN binge/purge subtype (AN-BP), if not, cases are categorized into AN restrictive subtype (AN-R). BN is characterized by recurring OBEs and compensatory behaviors, while for BED, there are recurring OBEs but no compensatory behaviors. In BED, the binge-eating behavior is

associated with distress, guilt, and/or shame, and/or eating without hunger until uncomfortably full, often in secrecy. Both OSFED and UFED comprise clinically significant EDs where criteria for main categories are not fulfilled. OSFED comprises AN except not underweight despite significant weight loss ('atypical AN'), and BN or BED with lower frequency of binge-eating (or purging in BN) episodes or shorter symptom duration. OSFED also comprises EDs with recurrent purging behaviors after smaller amounts of food ('purging disorder') and recurrent episodes of distress-eliciting night eating ('night eating syndrome'). UFED comprises severely disturbed eating patterns and psychological symptoms that do not fit any criteria.

The prior diagnostic system that was used until recently, DSM-IV (APA, 2000), specified AN (-R and -BP subtypes) and BN as main diagnoses, and ED not otherwise specified (EDNOS) for all other cases. Criteria for AN and BN were slightly less inclusive than their DSM-5 counterparts (e.g., AN required amenorrhea, behavioral symptom frequency criteria were higher in BN). Among EDNOS, six clinical presentations were described: 1) AN except no amenorrhea, 2) AN except not underweight, 3) BN except having lower binge-eating and/or purging frequency or duration, 4) normal weight and engagement in compensatory behaviors after small amounts of food, 5) repeated chewing and spitting out food, and 6) BED. Much research has been done on DSM-IV EDs, and so the following sections will interchangeably report findings using both diagnostic systems. This thesis includes treatment-seeking, Swedish individuals with AN-R, AN-BP, BN, BED, and OSFED. They were diagnosed according to DSM-IV but recategorized into DSM-5 to better represent EDs as they are currently defined.

2.1.2 Epidemiology, course, and outcome of EDs

Sub-clinical ED psychopathology and behavioral symptoms, such as restrictive eating, binge-eating and CE, are common in the general population, especially in young girls and women (Forsén Mantilla et al., 2014; Forsén Mantilla & Birgegård, 2015; Welch et al., 2011). However, only a subset develops diagnosable EDs. EDs can emerge in any age, gender, and population (Schaumberg et al., 2017), although they are more common in particular populations such as young females (Javaras et al., 2015). In young females, one-year prevalence of AN in the community has been estimated to 0.4% and for BN, 1% (Smink et al., 2012). EDNOS is likely more common than AN and BN, but there are no certain estimates (Fairburn & Bohn, 2005). In European women, a review of existing studies indicates that during their lifetime, <1-4% suffer from AN, <1-2% from BN, <1-4% from BED and 2-3% of sub-threshold EDs (~EDNOS/OSFED; Keski-Rahkonen & Mustelin, 2016). A large population-based Swiss study estimated the lifetime prevalence of AN, BN and BED, respectively, to 1.2%, 2.4% and 2.4 % in females, and 0.2%, 0.9% and 0.7% in males (Mohler-Kuo et al., 2016). Based on these findings, lifetime prevalence for EDs in Sweden would correspond to around 200,000 individuals (Clinton & Birgegård, 2018).

Far from all individuals with an ED seek treatment. In the Swiss study by Mohler-Kuo (2016), only 68% of women and 49% of men had sought any kind of psychiatric treatment for their EDs. Knowledge on features and outcome in such unrecorded EDs is limited, most research is done in treatment-seeking samples. In Sweden, during recent decades, a majority of specialized

ED treatment units have used the national quality registry Riksät. According to Riksät-data, self-reported time from first symptom to presentation to a treatment unit is around eight years (Rania et al., 2020), indicating that many sufferers have symptoms for a long time before seeking help. There may be several reasons for not doing so including stigma, shame, not feeling that one's symptoms are "serious enough", low motivation to decrease symptoms, and ambivalence about reducing symptoms (Evans et al., 2011; Lipson et al., 2017). With longer illness durations, negative consequences of the ED become more apparent which for some may increase motivation. However, with longer durations, symptoms may become more habitual and/or compulsive (Pearson et al., 2015; Walsh, 2013), and therefore, more difficult to reduce.

Even so, the majority of those suffering from an ED eventually recover, but there is great variability. In Sweden, remission rate at one-year follow-up in specialized ED treatment has been around 50% for the past seven years (Birgegård et al., 2020). For longer follow-ups (<5 years) and EDs in various settings, there is great variability between studies and diagnoses; remission rates range between 25-82% (Keel & Brown, 2010). AN tends to have the lowest remission rate followed by BN, and BED and OSFED/EDNOS highest. Additionally, the lowest remission rates are observed at shorter follow-up durations, with increasing remission rates follow-ups (Keel & Brown, 2010). However, relapse is common (Keel et al., 2005) and about one fifth of those with an ED develop a chronic course of illness (Keel & Brown, 2010). Also, even though recovered from AN and BN, a recent review found that a substantial number of recovered individuals have considerable residual ED psychopathology and behavioral symptoms (Tomba et al., 2019). Various types of comorbid psychopathology, overall quality of life, social functioning, and psychological well-being were also worse compared to controls after recovery, indicating that although many formally recover from EDs, there may still be substantial suffering negatively impacting on life.

2.1.3 Treatment of EDs

ED treatment as usual (TAU) often involves medical check-ups, psychoeducation about symptoms, supportive therapy, and/or various psychotherapeutic approaches; even though TAU often substantially consists of evidence-based elements, only a small portion of patients receive strictly defined evidence-based treatments (Kazdin et al., 2017). Generally, cognitive behavioral therapy (CBT) seems most effective and is recommended in clinical guidelines (National Institute for Health and Care Excellence, 2017; Wallin et al., 2015). In adolescent AN, family-based treatment is recommended although far from all patients remit (Carr, 2014), while in adult AN, there are no evidence-based treatments (Bulik et al., 2007). In BN, CBT-BN and enhanced CBT for EDs (CBT-E) are effective and recommended treatments while interpersonal psychotherapy (IPT) may also be effective (Agras et al., 2000; Fairburn et al., 2009, 2015). In BED, CBT seems fairly effective (Brownley et al., 2007). There are no recommended treatments for EDNOS or OSFED/UFED although CBT-E seems promising (Fairburn et al., 2009).

As evident, far from all who suffer from an ED seek treatment, and among those who eventually do, there is a considerable number of patients for whom there are no recommended

treatments (although available options may still be efficient), as well as a substantial number of patients who do not recover. Additionally, even when recovery is achieved, many display residual ED symptoms and lower overall well-being. New or refined treatment models are continually being developed, but a great barrier to effective treatments is the complex and partly unknown etiology of EDs.

2.1.4 ED etiology and maintenance

There are numerous both competing and partly overlapping psychological, biological, and sociological theories on ED etiology and maintenance. Knowledge of etiology is important for prevention efforts and involves the identification of *risk factors*. These represent factors that precede ED onset and that are associated with an increased risk of ED development. Due to the relatively low ED prevalence, examination of risk factors is methodologically complicated. Therefore, *potential risk factors* are more often examined. These are for instance represented by *associated traits*, meaning factors associated with symptom severity or factors differentiating healthy controls from those suffering from EDs. *Maintenance factors* are factors that are associated with symptom persistence over time (although some may be suggested primarily based on associations with symptom severity). Maintenance factors may differ from risk factors, and identification of such factors is particularly important for treatment efforts (Pearson et al., 2015; Stice, 2002).

There is a scarcity of formally defined risk factors for EDs. Identified risk factors include being female, internalization of the thin ideal, body dissatisfaction, and engaging in dieting (Striegel-Moore & Bulik, 2007). These are broad factors that do not explain why only a small subset develop EDs. Instead, most agree that the etiology of EDs is complex, affected by transactions between genetic vulnerabilities, psychological traits, and environmental characteristics (Culbert et al., 2015; Watson et al., 2019). As such, the identified risk factors likely increase the risk of EDs more for individuals with underlying vulnerability factors. Additionally, stressful life-events that are hard to cope with may contribute to ED development for vulnerable individuals (Loth et al., 2008; Troop & Treasure, 1997). There are several associated psychological traits and socio-emotional difficulties that are thought to serve as both risk and maintaining factors. Some are suggested as being ED-specific, while others may also affect other psychiatric symptoms, and thus, may help explain the high psychiatric comorbidity. Known associated psychological traits include maladaptive/clinical perfectionism (i.e., setting high standards while being overly self-critical; Dahlenburg et al., 2019), low self-esteem (Fairburn et al., 2003), neuroticism (i.e., negative and unstable emotionality; Cassin & Von Ranson, 2005; Levallius et al., 2015), harm-avoidance (i.e., being pessimistic, apprehensive, and risk averse; Cassin & Von Ranson, 2005), negative urgency (i.e., rashness and impulsivity when in distress; Pearson et al., 2015), compulsivity (Cassin & Von Ranson, 2005; Walsh, 2013), alexithymia (i.e., difficulties identifying and describing emotions; Westwood et al., 2017), and emotion dysregulation (Haynos & Fruzzetti, 2011). Closely related, socio-emotional difficulties are frequent in EDs. For instance, avoidance of expressing feelings to others, interpersonal distrust, more negative interactions with others, insecure attachment

patterns, perceived social inferiority, poor social support, and negative interpersonal interactions are common among patients with EDs (Arcelus et al., 2013; Caglar-Nazali et al., 2014; Treasure & Schmidt, 2013).

Some additional, treatment-relevant concepts are *predictors*, *treatment mediators*, and *mechanisms of change* in relation to outcome. In this context, predictors define initial factors predicting outcome, treatment mediators define processes impacting on outcome, and mechanisms of change specifically define psychological processes, affected by specific therapeutic techniques and the interpersonal therapeutic relationship, impacting on outcome (Petrik & Cronin, 2014; Vall & Wade, 2015). As such, mechanisms of change may overlap with maintenance factors. Few ED outcome predictors are replicated across studies, although less ED severity (e.g., lower ED pathology, higher BMI, shorter illness duration) and lower psychological and interpersonal impairment (e.g., higher self-esteem, lower comorbid psychopathology, fewer familial problems) are discernable themes often predicting better outcomes (Vall & Wade, 2015). Examination of treatment mediators and mechanisms of change have been less common in the outcome literature and only early symptom change has been consistently identified as a treatment mediator (Vall & Wade, 2015). However, the identification of reliable and clinically targetable predictors and mechanisms of change is crucial in order to increase treatment response.

This thesis focuses on the clinically targetable psychological traits emotion dysregulation and self-image, both assumed to contribute to the etiology, maintenance, and outcome of EDs. Briefly, emotion dysregulation refers to difficulties in understanding and managing one's (negative) emotions (Gratz & Roemer, 2004), while self-image relates to habitual self-directed evaluations and behaviors (Benjamin, 2018).

2.2 SOCIO-EMOTIONAL DEVELOPMENT

Emotion regulation and self-image are traits developed in ongoing interactions with primary attachment figures, starting in infancy but they continue to develop throughout life (Mikulincer & Shaver, 2019; Thompson, 2019). Initially, all affective states are recognized, labeled, and regulated by attachment figures. This is an important process within the attachment relationship, laying the foundation for further socio-emotional development and functioning. Through these early experiences, internal working models are formed (Bowlby, 1988), denoting implicit knowledge about what to expect and how to behave interpersonally. In parallel, the sense of self is developed. Emotion-related interpersonal interactions are introjected, shaping the child's developing sense of self as capable or deficient as well as deserving of acceptance and care, or of blame and neglect (Benjamin, 2018). Interpersonal theory posits that such introjected interactions often shape one's future self-directed thoughts, evaluations, and behaviors. Here, the way attachment figures respond to emotions in their children, particularly their negative emotions, is of great importance. For instance, if sadness and distress are answered by kind consolation, these emotions may later evoke warm self-soothing behavior.

There are also potentially heritable factors that likely affect socio-emotional development such as temperament, and emotional sensitivity and reactivity, as may more transient states like hunger, tiredness, and physical health (Eisenberg et al., 1998; Linehan, 1993). These factors may best be described as individual vulnerabilities (Linehan, 1993), whose effects are filtered through how important others respond to them. Emotion dysregulation is assumed to develop through interactions between individual vulnerabilities and invalidating responses from the environment (Calkins et al., 2019; Linehan, 1993). This is clearly described in the biopsychosocial model of emotion dysregulation in borderline personality disorder (Linehan, 1993). Invalidating response relates to interpersonal interactions where the emotional and cognitive experiences of an individual are neglected, misunderstood, criticized, or punished by others. The interaction between vulnerability and invalidation may lead to pervasive circles. Invalidation increases emotional arousal, and if such arousal seems undifferentiated and unmanageable for the individual, emotion dysregulation is more likely, for instance through dysfunctional behaviors such as self-harm or binge-eating providing temporary relief. Further, undifferentiated emotions and dysfunctional strategies reduce the ability to adaptively communicate emotions to others, yet again increasing the risk of invalidating response.

Such experiences are also assumed to negatively affect self-image, increasing negative aspects such as self-blame, -attack, and -neglect while decreasing positive aspects like self-affirmation, -love, and -protection (Benjamin, 2018). These experiences may also reinforce negative expectations in interpersonal interactions. If internal working models are templates for how interpersonal interactions are played out, self-image guides how such interactions are perceived and interpreted (Sullivan, 1953); this tends to be in line with the present self-image. Simply put, positive self-images make individuals more inclined to perceive and/or interpret benevolence in others' actions toward oneself, while negative self-images make individuals more prone to pick up potential hostile undertones. Also, there appears to be a self-fulfilling prophecy involved where one additionally tends to behave in ways that will evoke responses from others in line with one's present self-image (Benjamin, 2018). Therefore, similar to the vicious circle involving emotional vulnerability and invalidation (Linehan, 1993), not only will someone with a negative self-image more easily perceive interpersonal hostility; that person may also behave in ways that evoke more negative responses. These processes contribute to self-image tending to stabilize over time. Even so, both emotion dysregulation and negative self-image are traits that may change. New formative experiences, awareness of one's inter- and intrapersonal patterns, and the acquisition and practice of new skills and strategies may all contribute to better socio-emotional functioning (Benjamin, 2018; Linehan, 1993).

2.3 EMOTION-RELATED THEMES IN EDS

Emotion dysregulation has increasingly been recognized as a transdiagnostic associated trait in several psychiatric disorders including EDs (Aldao et al., 2010, 2016; Thompson, 2019). In fact, the impact of difficulties in emotional processing and regulation has long been recognized in EDs. A main contributor was Hilde Bruch, who emphasized difficulties in emotional and

interoceptive processing and understanding in her work on AN (Bruch, 1978; 1982). There is an increased interest in the role of emotion dysregulation in EDs and it has been associated with concurrent ED symptom levels in multiple studies using both clinical and non-clinical samples (Prefit et al., 2019). Some potential diagnostic differences have been suggested. AN has often been associated with impaired emotional expression, avoidance of emotion, and alexithymia (e.g., Treasure & Schmidt, 2013), with symptoms such as dietary restraint conceptualized as concrete ways of expressing and regulating inner experiences (Clinton, 2006; Skårderud, 2007a). In BN, negative urgency and emotional instability have been more in focus (Berner et al., 2017; Pearson et al., 2015), with binge-eating conceptualized as attempts to escape negative emotions (e.g., Heatherton & Baumeister, 1991). However, the emerging picture of emotion dysregulation and related emotional difficulties in EDs does not seem diagnosis-specific. Both AN and BN have been conceptualized as disorders of emotion dysregulation (Haynos & Fruzzetti, 2011; Pearson et al., 2015), and the influential transdiagnostic theory of EDs by Fairburn et al. (2003) describes “mood intolerance” and emotional avoidance typical of EDs generally. Alexithymia characterizes several ED diagnoses, along with heightened (negative) emotionality (Nowakowski et al., 2013; Overton et al., 2005). Both the transdiagnostic and diagnosis-specific formulations above suggest that individuals who develop EDs often have strong and/or long-lasting emotional reactions that is difficult to manage, either temperamentally, as an acquired trait, or as a state effect from poor nutrition.

Dysfunctional emotion regulation strategies are also common in EDs (Aldao et al., 2010; Nowakowski et al., 2013), and ED symptoms are increasingly conceptualized in terms of such strategies (Fairburn et al., 2003; Haynos & Fruzzetti, 2011; Heatherton & Baumeister, 1991). The momentary emotion regulating function of binge-eating has received empirical support in different EDs (Engel et al., 2013; Lavender et al., 2016; Leehr et al., 2015). Other behavioral symptoms such as restrictive eating, purging, and exercise may also increase positive and/or reduce negative emotions (Engel et al., 2013; Vansteelandt et al., 2007). Qualitative studies suggest that cognitive ED symptoms such as anxious preoccupation with food, shape, and weight and efforts of dietary restraint as well may regulate emotions, for instance through distraction and delocalization of emotional experiences towards the body (Espeset et al., 2012; Skårderud, 2007b). Also, symptoms of both AN (Walsh, 2013) and BN (Pearson et al., 2015) may start as impulsive actions providing temporary relief from emotional distress, but gradually evolve into compulsive behaviors subjectively experienced as unrelated to the negative emotions that may have triggered them.

2.3.1 Emotion dysregulation and the Difficulties in Emotion Regulation Scale

As is evident, emotion dysregulation is a broad concept used to refer to associations between emotions and symptoms, use of specific regulatory strategies, and trait-level emotion-related difficulties. Similarly, a variety of measures has been used in previous research, complicating comparison of results. Fortunately, an increasing number of studies in EDs have used the multidimensional model by Gratz and Roemer (2004) and its accompanying instrument, the Difficulties in Emotion Regulation Scale (DERS). This model, describing trait-level emotion

dysregulation, was developed to capture the following four clinically relevant dimensions of emotion dysregulation: 1) *difficulties in emotional awareness and clarity* describing inability (or unwillingness) to focus on emotional signals and insufficient understanding of them, resembling alexithymia (e.g., “I care about/pay attention to how I feel” [reversed], “I am confused about how I feel”), 2) *non-acceptance of emotional distress* describing tendencies to respond with negative secondary emotions such as self-directed anger or shame towards one’s own distress (e.g., “When I’m upset, I become angry with myself for feeling that way/I feel like I am weak”), 3) *difficulties maintaining impulse control and goal-directed behaviors when upset* describing difficulties controlling one’s reactions and behavior when in distress (or fear of losing this control), resembling negative urgency (e.g., “When I’m upset, I feel out of control/I lose control over my behaviors/I have difficulty focusing on other things”), and 4) *perceived lack of emotion regulation strategies when upset* describing a sense of “emotional helplessness” with a tendency to surrender to negative emotions (e.g., “When I’m upset, my emotions feel overwhelming/I believe there is nothing I can do to make myself feel better”).

2.3.2 Aspects of emotion dysregulation and associations with ED symptoms

The relative importance of these aspects in different EDs and for specific symptoms has been examined in some previous studies. Generally, patients with EDs report more emotion dysregulation than controls (Brockmeyer et al., 2014; Mallorquí-Bagué et al., 2018), but results on potential diagnostic differences are contradictory. The only consistent finding is that patients with AN-R report less impulse control difficulties than patients with AN-BP (Brockmeyer et al., 2014; Haynos et al., 2014; Mallorquí-Bagué et al., 2018; Rowsell et al., 2016; Weinbach et al., 2018). Otherwise, relatively lower emotion dysregulation has been reported either in BED (Brockmeyer et al., 2014; Svaldi et al., 2012) or AN-R (Mallorquí-Bagué et al., 2018). No diagnostic differences at all have also been reported (Harrison et al., 2010; Pisetsky et al., 2017). Further, findings concerning aspects of emotion dysregulation in relation to specific symptoms are mixed. More serious ED psychopathology has been uniquely associated with greater difficulties in emotional awareness in AN (Racine & Wildes, 2013), and with higher perceived lack of emotion regulation strategies in a heterogeneous group of AN, BN, BED and OSFED (Pisetsky et al., 2017), while no aspect showed unique associations with ED psychopathology in BN (Lavender et al., 2014). Higher impulse control difficulties have been uniquely associated with binge-eating and purging in AN (Racine & Wildes, 2013), and with purging in the heterogenous ED group in Pisetsky et al. (2017). In BN, higher difficulties in goal-directed behavior have been associated with higher CE but lower purging frequencies (Lavender et al., 2014).

These findings suggest self-rated trait-level emotion dysregulation, with explicit implications for perceptions of self-worth and sense of competence, as a potentially transdiagnostic associated trait that might be involved in both ED development and maintenance. However, only one study compared the whole spectrum of EDs (Mallorquí-Bagué et al., 2018) and diagnostic subgroup sizes have generally been small. Further, methodologies (e.g., adjust for anxiety/depression or not), outcome variables (e.g., presence vs. frequency of behavioral

symptoms), as well as sample size and composition (e.g., only AN or BN, or mixed EDs) have differed between the three studies on specific ED symptoms (Lavender et al., 2014; Pisetsky et al., 2017; Racine & Wildes, 2013). As such, specific differences between patients and control participants remain unclear, as do potential diagnostic differences. Similarly, results on unique associations between emotion dysregulation aspects and specific symptoms need replication in order to inform treatment approaches.

2.3.3 Emotion dysregulation and associations with ED outcome

Given the increased interest in emotion dysregulation and EDs, interventions targeting emotion dysregulation are increasingly being developed. These include Emotion Acceptance Behavioral Therapy for AN (Wildes & Marcus, 2011), Integrative Cognitive-Affective Treatment for BN (ICAT; Wonderlich et al., 2015), Emotion Focused Therapy for EDs (Wnuk et al., 2015), the transdiagnostic CBT-E module ‘mood intolerance’ (Fairburn et al., 2003), and interventions inspired by Dialectical Behavior Therapy (DBT) and Acceptance and Commitment Therapy (Federici et al., 2012; Haynos et al., 2016). However, surprisingly few studies have examined the role of emotion dysregulation in ED outcome.

Existing studies generally show overall improvement in both emotion regulation and ED pathology over time (MacDonald & Trottier, 2019; Peterson et al., 2017), but results on their interrelations are somewhat mixed. Initial emotion dysregulation showed some associations with improvements in ED psychopathology in patients with BN in a trial comparing ICAT to CBT-E (Accurso et al., 2016), but not in another project (MacDonald et al., 2017; MacDonald & Trottier, 2019). Initial emotion dysregulation was additionally associated with reduced behavioral symptoms in BN (Accurso et al., 2016), and BED (comparing ICAT to CBT guided self-help; Anderson et al., 2020). Associations between change in emotion dysregulation and ED outcome are more consistent. Here, reductions in emotion dysregulation have been associated with ED remission in a range of EDs (Mallorquí-Bagué et al., 2018); reduced ED psychopathology after treatment in BN (MacDonald et al., 2017; MacDonald & Trottier, 2019; Peterson et al., 2017), BED (Hazzard et al., 2020; Juarascio et al., 2017), and AN (Rowell et al., 2016); and reduced behavioral symptoms in BN and BED after treatment (e.g., Hazzard, 2020; MacDonald et al., 2017).

Hence, emotion dysregulation may represent a mechanism of change influencing outcome rather than a predictor of outcome. However, emotion dysregulation as either predictor or mechanism was only examined in a subset of studies and only in BN and BED (Accurso et al., 2016; Andersson et al., 2020; Hazzard et al., 2020; MacDonald et al., 2017; MacDonald & Trottier, 2019; Peterson et al., 2017). Further, patients in the reviewed studies received either ICAT or CBT, with or without some emotion regulation add-on, which does not represent overall ED treatment settings (Kazdin et al., 2017). Treatment length also varied between studies, as did the change time period, outcome measures, and follow-up durations. No study followed patients up to 12 months. Thus, knowledge of the role of emotion dysregulation in ED outcome in broad EDs, regardless of treatment form, and over longer follow-ups is lacking.

2.4 SELF-RELATED THEMES IN EDS

Negative and critical ways of evaluating oneself is a feature in several psychiatric disorders such as depression, social anxiety disorder, obsessive compulsive disorder, personality disorders, psychotic symptoms, and EDs (Bardone-Cone et al., 2007; Werner et al., 2019). In EDs however, the negative self-directed approach may be particularly salient, perhaps even more so than in other disorders. Diagnostic criteria for both AN and BN highlight that self-worth has increasingly come to depend on weight and shape (APA, 2013), and (struggles for) control over one's eating is also central for self-evaluations. As this kind of control cannot be achieved once and for all, EDs imply constantly keeping oneself under strict, fearful, and harsh monitoring, with mistakes having devastating effects on self-evaluation. EDs also imply doing potentially dangerous things to oneself (e.g., starvation, exercising despite exhaustion or injuries, eating until being sick, painful purging), often against one's actual will, better knowledge, and physical or psychological needs. That is, negative and critical attitudes towards the self in EDs is not only represented by passive evaluations, but instead imply a wide range of negative, self-directed behaviors tightly connected with symptoms. These negative self-directed evaluations and behaviors and strivings for control do seem not exclusively related to food, shape, weight, and eating, but may also be evident in relation to other aspects in life (Bardone-Cone et al., 2007), such as setting high standards and being fearful of making mistakes in social contexts, school, and work. Additionally, although coming with a very high price, perceiving this way of attending to oneself as a pervasive, in part beneficial, part of the personality (in that it is perceived as a trait enabling achievement in life), may be particularly true in EDs (Thew et al., 2017).

Accordingly, self-related traits are highlighted in both theoretical and empirical work in EDs. For instance, the transdiagnostic theory of EDs consider low self-esteem as a key characteristic of EDs, and 'core low self-esteem' is suggested as a central maintaining mechanism (Fairburn et al., 2003). Accordingly, self-esteem has often been examined in EDs, mainly defined as a global evaluation of the self, where patients generally evaluate themselves more negatively than healthy controls (e.g., Caglar-Nazali et al., 2014). Additionally, perfectionism, self-control, and compulsivity are central in EDs, particularly but not exclusively in AN (Fairburn et al., 2003; Godier & Park, 2014; Walsh, 2013). Again, Hilde Bruch was an early contributor, being the first to describe ED symptoms as ways of trying to manage perceived lack of (self-) control and ineffectiveness in life (Bruch, 1978, 1982). Also, moments of actual loss of control (in relation to eating) is central when considering binge-eating.

2.4.1 Self-image and the Structural Analysis of Social Behavior

However, even though the sense of self is a complex phenomenon, self-esteem and other self-related concepts and measures most often capture unidimensional aspects (e.g., like-dislike, being self-controlling or not). In interpersonal theory instead, the self is conceptualized in terms of both habitual self-directed evaluations and behaviors (i.e., self-image), formally defined as *introject* (Benjamin, 2018). The term introject capture the theoretical assumption that interpersonal interactions with significant others are *introjected* to form the self-image, that is,

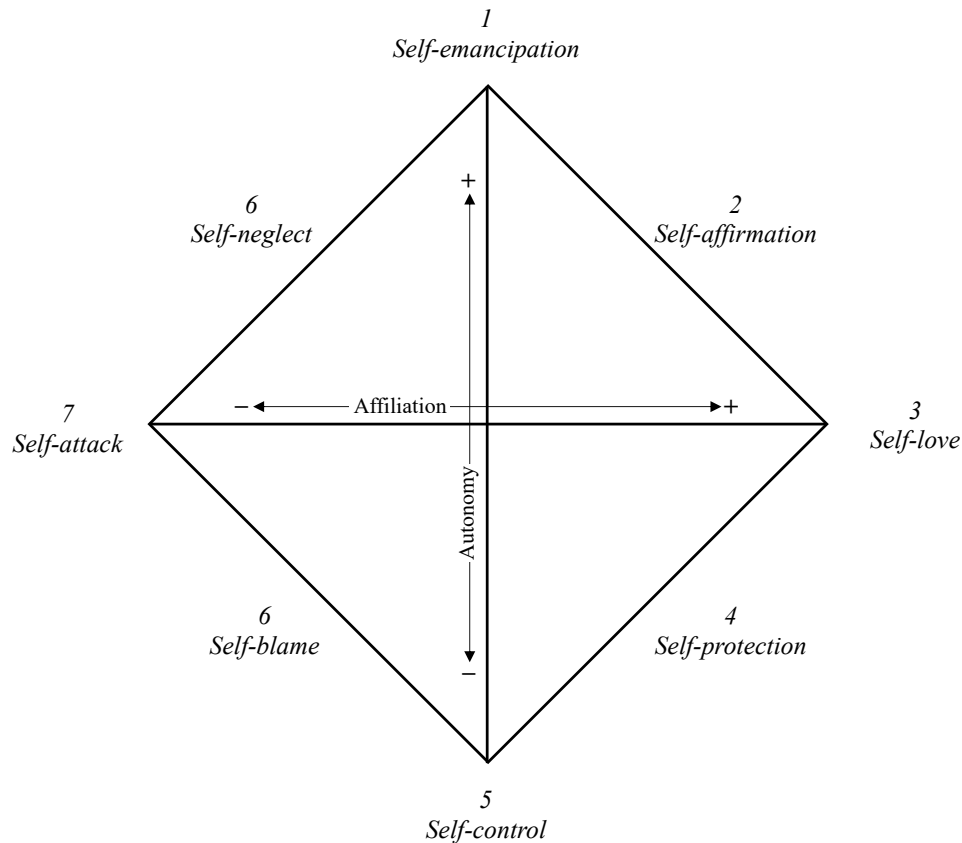


Figure 1. Structural Analysis of Social Behavior Intrex model Cluster version. From: Benjamin LS. *Interpersonal Diagnosis and Treatment of Personality Disorders*, 2nd ed. New York: The Guilford Press, 1996.

the way one perceived that one was treated by important others while growing up will be the model for how one will come to think, evaluate, and behave internally towards oneself. Further, the self-image is assumed to influence perceptions and interpretations of, as well as actual behavior in, present interpersonal interactions (as described in section 2.3). As such, self-image is in a way both an intra- and interpersonal concept. The Structural Analysis of Social Behavior (SASB) model and accompanying measure organizes these self-directed evaluations and behaviors in a circumplex (Figure 1; Benjamin, 1996). The horizontal Affiliation axis captures affective valence of evaluations and behaviors (love-hate/attack), while the vertical Autonomy axis instead captures self-regulation style (emancipation-control). The combinations of these axes form different types of self-image profiles, grouped into the following eight ‘clusters’.

Self-emancipation describes a spontaneous or free self-regulative style (e.g., “I let myself drift with the moment; I have no internal direction, goals, or standards”) as opposed to strict *self-control* (e.g., “I try very hard to make myself be as ideal as possible”). *Self-affirmation* combines the free self-regulation style with active self-love which results in a friendly and accepting approach to oneself (e.g., “Knowing both my faults and strong points, I comfortably let myself be as is”). On the opposite end, *self-blame* instead combines self-control and self-attack which results in a hostile and harsh self-regulation style partly overlapping maladaptive perfectionism (e.g., “I accuse and blame myself until I feel guilty, bad, and ashamed”). *Self-*

love and *self-attack* are most similar to the self-esteem concept, capturing affective valence towards the self, concretized by active self-love (e.g., “I like myself very much, and feel good when I have a chance to be with myself”) as opposed to hateful self-attacks (e.g., “I think of ways of hurting and destroying myself, I am my own worst enemy”). *Self-protection* is a combination of active self-love and self-control, concretized by active engagement in activities that is perceived as beneficial to the self along with protection of self-interests (e.g., “I naturally and easily provide for, nurture, and take care of myself”), while *self-neglect* on the opposing end describes negative autonomy concretized by ignoring one’s own needs and safety (e.g., “I’m rash, carelessly I let myself end up in destructive situations”). A primarily negative self-image is characterized by increased levels of self-blame, -attack, and/or -neglect, and decreased levels of self-affirmation, -love, and/or -protection, while a primarily positive self-image is characterized by the reverse.

2.4.2 Self-image and associations with ED symptoms

In research using SASB, adult patients with EDs have reported more negative self-image compared to both healthy and sub-clinically depressed comparison participants, particularly in terms of lower self-affirmation and higher self-attack and -blame (Björck et al., 2003). Adolescent and younger adult patients with EDs have also reported more negative self-image aspects than comparison groups (Forsén Mantilla et al., 2014; Forsén Mantilla & Birgegård, 2015). Within EDs, in line with theoretical formulations, patients with AN have reported significantly higher self-control and lower self-emancipation than other EDs, while patients with BED generally report more overall positive self-images compared to other EDs (Björck et al., 2003). In terms of associations with concurrent symptoms, lower self-affirmation and -love, and higher self-blame have been uniquely associated with higher ED psychopathology in both patients with a range of EDs (from the same data source as the present thesis), as well as in student and sub-clinical comparison groups (Forsén Mantilla et al., 2014; Forsén Mantilla & Birgegård, 2015). These associations were considerably stronger in patients. Taken together, lower self-affirmation/-love as well as higher self-attack/-blame differentiate patients from controls and show unique associations with symptom severity in samples with different clinical statuses. Thus, these may represent both potential risk and maintenance factors.

2.4.3 Self-image and associations with ED outcome

Self-image has also been associated with ED outcome, particularly as a predictor. Higher initial self-attack has predicted poorer 3-year outcomes across ED diagnoses, being a stronger predictor than initial ED symptoms, general psychopathology, and interpersonal relationships (Björck et al., 2007). Lower initial self-love and higher self-attack and -blame also predicted poorer one-year outcome, both in terms of remission and ED psychopathology, across ED diagnoses from the same data source as the present thesis (Forsén Mantilla, Norring, et al., 2019). Some associations remained when adjusting for initial ED psychopathology. Further, improvement in self-image has been associated with better outcomes. Both reductions in negative self-image aspects and increases in positive aspects were associated with improvements in global ED psychopathology, but not binge-eating and purging frequency, for

the patients who enrolled in the ICAT trial (Peterson et al., 2017). Conversely, in BED, reductions in negative self-image aspects (but not increases in positive) predicted reductions in binge-eating frequency, but not global ED psychopathology (Hazzard et al., 2020). Thus, self-image may represent both a predictor and mechanism of change of ED outcomes, although evidence for the latter is sparser.

2.5 EMOTION DYSREGULATION, SELF-IMAGE, AND EDS

As is evident, both emotion- and self-related aspects are central themes in EDs. Accordingly, several theoretical models of ED etiology and maintenance, some with accompanying treatment approaches, include both these themes (Pennesi & Wade, 2016). These include for instance the aforementioned transdiagnostic theory of EDs with ‘mood intolerance’, ‘clinical perfectionism’, and ‘core low self-esteem’ as potential maintenance factors (Fairburn et al., 2003); the cognitive-interpersonal maintenance model of AN highlighting alexithymia, avoidant emotional processing, and compulsivity (Treasure & Schmidt, 2013); the model underlying ICAT for BN/BED with emotion dysregulation, self-image, and self-discrepancy as central concepts (Wonderlich et al., 2015); and the ED-adapted Compassion Focused Therapy (CFT) model highlighting shame, self-criticism, and lack of self-compassion (Gale et al., 2014; Goss & Allan, 2009). However, evidence for how a broad range of emotion dysregulation dimensions and specific self-related concepts influence ED psychopathology is lacking. Existing models use different terminology, tend to study isolated aspects of emotion regulation (e.g., alexithymia) and self-related cognition/behavior (e.g., self-esteem), and few examine a wide range of emotion- and self-related constructs simultaneously. They also have different focus on risk versus maintenance factors and are therefore difficult to compare and evaluate in terms of causal mechanism chains, that is, with one factor affecting another which in turn might affect how symptoms are expressed.

The DERS and SASB models encompass important concepts in several existing models. Their combination could therefore integrate models, disentangle association pathways, and increase specificity. The socio-emotional developmental origin of both emotion (dys)regulation and self-image, and their mutual focus on socio-emotional functioning and self-regulation, indicate that they are interconnected or partly overlapping. Potential causality is however unclear, both developmentally and from a ‘here and now’ perspective. Emotion dysregulation may affect the perceived sense of self, but the sense of self may also affect emotion dysregulation, where both processes may impact ED symptoms. For instance, experiencing emotions as frightening, out of control, or unmanageable (*“I don’t know how to make these bad feelings go away”*) could increase negative self-evaluations and harsh strategies in trying to regulate oneself (*“I’m a weak person who cannot control myself, I have to pull myself back together”*), potentially by increasing efforts toward controlling one’s body (*“I have to exercise harder”*). Alternately, a negative evaluation of the self and a self-blaming attitude (*“I’m such a loser, I cannot do anything right”*) may increase negative emotions that are hard to cope with (*“I hate that I feel so sad”*), potentially increasing ED pathology as ways of trying to manage these emotions

short-term (*“I have to purge to at least make myself clean”*). Knowledge about the most likely pathway could inform treatment by identifying proximal and distal treatment targets as well as framing interventions in ways that better match patients’ subjective experiences.

2.5.1 Examining associations between emotion dysregulation, self-image, and ED psychopathology

Mediation models are tools for exploring the pathways by which emotion dysregulation and self-image may affect ED psychopathology. These models are ideal for trying to disentangle interrelations between theoretically or empirically associated factors and can indicate potential pathways whereby they affect each other (Hayes, 2018). Briefly, these models describe whether two factors are directly or indirectly associated in relation to a third or more factor/-s, where an indirect association suggests that the third factor transmits, or ‘mediates’, some or all of the association (see Methods, section 4.4.1 for a detailed description of mediation models). Examination of such models in individuals both with and without EDs could indicate similarities or differences depending on clinical status, with implications for ED development. Similarly, given the diagnostic diversity within EDs, examination of such models in patients with different symptom profiles could indicate potential pathology-specific maintenance pathways. However, as diagnostic migration is common within EDs (Schaumberg et al., 2019) and as specific ED diagnoses have rather low validity (e.g., Peat et al., 2009), diagnosis-specific models may be overly narrow. Even so, some differences in emotion and self-related themes are discernible between primarily restricting patients and those patients with the loss of control that typifies binge-eating. This could reflect underlying differences in impulsivity (Claes et al., 2002), with impulse control difficulties and negative urgency seemingly more associated with binge-eating (Fernández-Aranda et al., 2008; Peterson & Fischer, 2012), while over-controlled regulation and compulsivity instead seem more associated with pathological restrictive eating without binge-eating (Godier & Park, 2014; Hempel et al., 2018). Such differences are likely associated with emotion dysregulation, self-image, and their potential association pathways in relation to ED psychopathology.

2.6 SUMMARY

EDs are severe disorders negatively impacting on life. Far from all sufferers seek treatment, and among those who do, not all recover. Additionally, for those who do recover, many still have residual ED symptoms, comorbid psychopathology, lower quality of life, and lower psychological well-being. Emotion dysregulation and self-image are traits with implications for socio-emotional functioning, interpersonal relationships, and various forms of psychopathology, including EDs. Thus, they may represent traits in which improvement could benefit all these areas. Higher emotion dysregulation and a more negative self-image both seems to differentiate patients from controls, and independently, both concepts have showed associations with ED symptom severity.

However, there are several gaps in the literature regarding emotion dysregulation and EDs. For instance, evidence of specific aspects of emotion dysregulation in relation to differences between EDs and controls, between different EDs, and in relation to specific ED symptoms is both contradictory and inconclusive. Therefore, replication in large samples representing a range of EDs is needed. Increased knowledge about specific aspects of emotion dysregulation that may differentiate patients from comparison groups could indicate potential risk factors. Further, diagnostic differences in aspects of emotion dysregulation, as well as unique associations with specific ED symptoms, could indicate potential diagnosis- and/or symptom-specific maintenance factors. Examination of potentially symptom-specific maintenance factors in both patients and comparison groups may additionally indicate if such maintenance factors exist on a continuum (i.e., similar processes may contribute to symptoms ranging from mild eating, shape, and weight-related concerns to severe ED psychopathology) or if there is substantial differences depending on if you are ill or not (i.e., subclinical concerns are different from concerns when suffering from a fully developed ED and the processes maintaining each category are different; Gleaves et al., 2004). Combined, such knowledge may inform if approaches to treatment targeting emotion-related themes should differ depending on diagnosis or in relation to specific symptoms (i.e., diagnosis-specific or symptom-specific), or if similar approaches may be suitable regardless of diagnosis or main type of pathology (i.e., transdiagnostic approaches). It may also indicate whether emotion-related components in ED treatment models may also alleviate sub-clinical concerns.

Further, although some prior research suggests that emotion dysregulation is a potential mechanism of change rather than a predictor in relation to ED outcome, very little is known of emotion dysregulation in relation to ED outcome across the diagnostic spectrum of EDs, and in TAU. Self-image has shown strong concurrent associations with ED pathology. Self-image also seems to represent a predictor of, as well as a mechanism of change in relation to, ED outcome across EDs receiving both TAU and evidence-based treatment approaches. However, no work has examined the interplay between self-image and emotion dysregulation in relation to either concurrent ED psychopathology or outcome. Such knowledge could inform theories of ED maintenance and may also present a framework for when and how interventions targeting self-directed evaluations and behaviors (i.e., self-image) and emotion dysregulation might be effective. Also, by drawing on the theories underlying self-image and emotion dysregulation, such knowledge could inform on how patterns of interpersonal interactions may either improve or exacerbate symptomatology in those suffering from EDs.

3 RESEARCH AIMS

Overall, this thesis aimed to address several gaps in the existing literature by an in-depth examination of aspects of emotion dysregulation in relation to diagnostic presentation, specific ED symptoms, and ED outcome. It also aimed to examine direct and indirect associations between emotion dysregulation, self-image, and ED psychopathology, in ways that may inform both risk and potentially pathology-specific maintenance models. Lastly, it aimed to clarify if, and in that case how, these concepts may impact on ED outcome. These broad aims were examined in four separate studies. These studies used data from a clinical sample consisting of patients with AN-R, AN-BP, BN, BED, and OSFED presenting to specialized Swedish ED treatment units and a sample of female university students as a comparison group. Specific aims for each study are described below.

Study I examined potential differences in both overall and specific aspects of emotion dysregulation between the sample of patients with different EDs and the comparison sample. The study also explored potential diagnostic differences in these aspects. This study also examined unique associations between aspects of emotion dysregulation and specific ED symptoms in both patients and the comparison sample. The symptoms examined were both cognitive and behavioral. Cognitive symptoms were overall ED psychopathology as well as specific psychopathology defined as (efforts of) dietary restraint, and preoccupation with eating, shape, and weight, respectively. Behavioral symptoms were presence of OBE, SBE, purging (self-induced vomiting only), and CE. This study was conducted as the second study chronologically, but as it lays the groundwork regarding aspects of emotion dysregulation in relation to both patients and comparison samples, it will be presented as the first.

Study II increased the theoretical complexity by additionally examining the association between emotion dysregulation and self-image, as well as their associations in relation to ED symptoms, in the comparison sample. Specifically, this study contrasted two possible mediation models specifying two different indirect association pathways: 1) an indirect association between emotion dysregulation and ED pathology through self-image, or 2) an indirect association between self-image and ED pathology through emotion dysregulation. These two models were explored in relation to five different types of ED symptoms: ED psychopathology, OBE, SBE, any CE, and regular CE. These symptoms were chosen as they were relatively prevalent in these women at a subclinical level, whereas purging (i.e., self-induced vomiting, use of diuretics and/or laxatives) was rare.

Study III examined direct and indirect associations between overall emotion dysregulation and self-image in relation to ED psychopathology in patients with EDs in order to replicate the main findings from Study II. In order to increase specificity, additional analyses extended the previous work by exploring direct and indirect associations using particular emotion dysregulation dimensions and distinct self-image aspects. Further, in order to capture a wider and more ecologically valid clinical picture, patients were grouped into two broad categories

depending on presence or absence of loss-of-control binge-eating (i.e., OBE) and the models were examined separately in both groups.

Study IV sought to clarify the role of both overall, and aspects of, emotion dysregulation as predictors, mechanisms of change, or both in relation to ED outcome in a subset of patients with complete follow-up data after one year in specialized ED treatment. In order to broadly capture ED outcome, associations with both ED psychopathology at follow-up and diagnostic remission, respectively, were examined. Specifically, these outcomes were predicted by initial levels of overall and specific aspects of emotion dysregulation, and by change in these emotion dysregulation variables from initial registration to follow-up. This study also examined pathways whereby change in emotion dysregulation and self-image might influence change in ED psychopathology over one year. Specifically, two exploratory mediation models using variables of change from initial registration to follow-up were examined, specifying two different indirect association pathways: 1) an indirect association between change in emotion dysregulation and change in ED psychopathology, through change in self-image, or 2) an indirect association between change in self-image and change in ED psychopathology, through change in emotion dysregulation.

4 MATERIALS AND METHODS

4.1 OVERALL METHODOLOGY

This thesis used self- and clinical ratings from female university students and patients in specialized ED treatment. Three studies were cross-sectional and one used one-year follow-up data. All analyses were quantitative. Overall study methodology is presented in Table 1.

Table 1. Thesis study overview.

Study	I	II	III	IV
Aims	Examine potential emotion dysregulation differences between patients and students, and between diagnoses. Examine unique associations between emotion dysregulation and ED symptoms.	Examine associations and potential direct and indirect effects between emotion dysregulation, self-image, and ED pathology.	Examine potential direct and indirect effects between emotion dysregulation dimensions, self-image aspects, and ED psychopathology in patients with or without binge-eating.	Examine associations between initial, and change in, emotion dysregulation and one-year ED outcome. Examine potential direct and indirect effects between one-year change in emotion dysregulation dimensions, self-image aspects, and ED psychopathology.
Participants	999 female patients (ages 16-72) 252 female university students (ages 19-35)	252 female university students (ages 19-35)	439 female patients without binge-eating 560 female patients with binge-eating	307 patients (ages 16-58)
Measures	DERS, EDE-Q SEDI, CPRS	DERS, SASB, EDE-Q	DERS, SASB, EDE-Q SEDI	DERS, SASB, EDE-Q SEDI, CPRS
Statistical analyses	(M)ANCOVA + post-hoc tests Hierarchical stepwise regression	Pearson correlation Simple mediation analysis	Simple and parallel mediation analysis	Multiple regression Simple mediation analysis with change scores

Note: CPRS = Comprehensive Psychopathological Rating Scale; DERS = Difficulties in Emotion Regulation Scale; ED = eating disorder; EDE-Q = Eating Disorder Examination Questionnaire; (M)ANCOVA = multivariate analysis of covariance; SASB = Structural Analysis of Social Behavior; SEDI = Structured Eating Disorder Interview

4.2 PARTICIPANTS

4.2.1 The Stepwise registry

Data from clinical participants were extracted from the Stepwise clinical support system and database (Birgegård et al., 2010). Stepwise has been in use since 2005 and includes data from patients entering ED specialist treatment at any of the participating treatment units in Sweden. Stepwise inclusion criteria include self- or medical referral to an ED treatment unit, a DSM-IV ED diagnosis (APA, 2000), and established intent to treat from the unit. Stepwise include several potential assessment points: initial, quarterly, and 1-, 2- and 3-year assessments; the initial and one-year assessments are mandatory and used in the thesis. Stepwise assessment has been part of standard procedures at participating units; however, patients (or legal guardians for younger patients) can deny permission for their data being used in research.

Stepwise initial assessment includes semi-structured interviews, clinical ratings and self-reports. Some ratings are mandatory, others are optional at individual patient level, and some

measures differ depending on age. The DERS is optional since its inclusion into Stepwise in April 2014. There are no item-level missing data as this is technically prohibited. Initial assessment takes around 45 minutes and is performed by trained professionals at the patients' 3rd visit to the clinic for outpatients and within the first week of care for in-patients. One-year assessment is methodologically similar to the initial assessment, but treatment-related information is also added including treatment status, day- and/or inpatient care frequency (if any), treatment modalities (psychotherapy, supportive therapy, psychoeducation, physical/dietary counselling, physiotherapeutic treatment, assisted eating, and others), and type of psychotherapy (CBT, psychodynamic, IPT, systemic, DBT, and others). It is performed within a 10-week window (+/- five weeks) after the initial assessment. Although the one-year assessment is mandatory, there is considerable attrition. Attrition can be due to both patient and clinician/treatment unit factors (e.g., patient drop-out, treatment time constraints, follow-ups not encouraged by unit). Stepwise attrition has previously been reported between 40-64%, with a trend of higher attrition the longer Stepwise has been running (Rania et al., 2021).

4.2.2 The clinical sample

Data for **Studies I** and **III** were extracted October 30th, 2016. Initial exclusions were registrations prior to April 7th, 2014 (no DERS-ratings prior to this date), age <16 years, and no ED after assessment; this left 3693 potential cases. Secondary exclusions were blank/incomplete registrations ($n=272$), no research consent ($n=128$), no ED diagnosis ($n=309$), types of EDNOS not relevant for this study ('other' $n=64$, EDNOS 'chewing and spitting' $n=57$), duplicate/multiple registrations (first kept; $n=51$), and males ($n=129$). This left 2683 patients. Lastly, patients without DERS were excluded ($n=1684$), leaving 999 patients in the final sample (37% of potential patients). Criteria for the decision of individual clinicians to include DERS or not were not recorded. Analysis of missing data showed that the most common pattern was to choose either no or several optional measures (true for >50% of those with DERS). The DSM-IV EDs were recategorized post-hoc using DSM-5 criteria: AN-R and EDNOS Type 1 ('AN without amenorrhea') without binge-eating and/or purging into DSM-5 AN-R; AN-BP and EDNOS Type 1 with bingeing and/or purging into AN-BP; BN and EDNOS Type 3 ('low frequency BN') into BN; EDNOS Type 6 into BED; and lastly, EDNOS Type 2 ('AN except not underweight') and EDNOS Type 4 ('compensatory behaviors after small food amounts') into OSFED. In the final sample, 172 participants had AN-R (17%), 64 had AN-BP (6%), 350 had BN (35%), 40 had BED (4%), and 373 had OSFED (37%).

In **Study III**, participants were categorized into two groups depending on presence/absence of OBE, mainly based on their diagnosis. However, in AN-BP and OSFED, symptoms may or may not include OBE (as in AN-BP, the binge/purge may in some participants refer to purging only), and group affiliation was decided by self-rated presence of OBE in the last month (see measures). Non-OBE EDs ($n=439$) consisted of all AN-R participants, and AN-BP and OSFED participants lacking OBE ($n=35$ and 232, respectively). OBE EDs ($n=560$) consisted of all BN ($n=350$) and BED participants ($n=40$), and AN-BP and OSFED participants with OBE ($n=29$ and 141, respectively).

Data for **Study IV** were extracted February 19th, 2020. Initial exclusions were identical to **Studies I** and **III** and left 5335 potential cases. Secondary exclusions – no general research consent ($n=214$), blank/incomplete registrations ($n=239$), not relevant EDNOS ('other' $n=110$; 'chewing and spitting' $n=83$), and duplicate/multiple registrations (first kept; $n=114$) – left 4577 patients. After excluding patients without initial DERS ratings ($n=2588$) and patients without complete follow-ups (both diagnostic assessment and follow-up self-rated ED symptoms [see measures]; $n=1682$), 307 participants remained in the final sample (158 also had follow-up DERS). When excluding participants that had not yet passed the follow-up assessment window ($n=336$), attrition rate was 79.9%. For the remaining, patient-related reasons for attrition were recorded in 506 cases including patients that could not be reached/could not attend ($n=145$; 29%), declined follow-up assessment ($n=189$; 37%), or had at a later timepoint turned out not eligible for treatment at the units ($n=172$; 34%). For those 840 patients without this information, administrative reasons and/or lack of time at the units are likely common reasons for attrition.

DSM-IV diagnoses were recategorized as described above, and follow-up EDNOS 'other' and 'chewing and spitting' were classified as UFED. In the final sample ($N=307$), 95% were females and 50 participants had AN-R (16%), 15 had AN-BP (5%), 104 had BN (34%), 19 had BED (6%), and 119 had OSFED (39%). At one-year follow-up, treatment was terminated for almost half of participants. Between the initial and follow-up assessment, most participants (63%) had received psychotherapy and/or supportive therapy in combination with other interventions (e.g., psychoeducation, physical/dietary counselling, physiotherapeutic treatment, assisted eating). More than half had received psychotherapy, mostly CBT with or without additional psychotherapy/-ies.

4.2.3 The comparison sample

The **Studies I** and **II** comparison sample consisted of female university students at Stockholm University. Data was collected for a Psychology master thesis in 2013 at lectures (at seven humanistic-social sciences institutions), fixed occasions for drop in participation (Psychological Institution only), and advertisement around the campus area. Questionnaires (SASB, DERS, ED symptoms [see measures], four additional questionnaires not included in the thesis) were administrated as a booklet. Time for participation was estimated to 30-40 minutes. All participants gave informed consent regarding storage and use of data and were rewarded by a gift certificate (150 SEK) or course credit. Out of the 374 students who received the questionnaires, 288 (77 %) completed participation. Exclusions were age>35 (a priori decision to match typical clinical ED populations; $n=28$) and missing data ($n=8$). No final participant had more than two missing items for any one instrument (no imputation of data as relevant measures could be computed with some missing items).

The final sample consisted of 252 participants. Age ranged between 19-35 years ($M=23.7$; $SD=3.58$) and BMI between 15.6-44.4 ($M=22.4$; $SD=3.68$). Of the final sample, 181 (72%) participants were recruited at lectures, 34 (13%) at fixed occasions for drop-in participation, and 37 (15%) by advertisement around the campus area. There were no significant differences

between subsamples depending on recruitment method on any variable (examined by analysis of variance [ANOVA] and post-hoc tests, $ps > .05$; data not shown).

4.3 MEASURES

4.3.1 The Difficulties in Emotion Regulation Scale (DERS)

The DERS (Gratz & Roemer, 2004) measures self-rated emotion dysregulation by 36 items scored 1–5 (almost never – almost always). DERS provides a Total Score reflecting general emotion dysregulation and six subscales: *Non-acceptance* (non-acceptance of emotions), *Goals* (difficulties maintaining goal-directed behavior when upset), *Impulse* (difficulties remaining in control of one's behavior when upset), *Awareness* (inability and/or unwillingness of emotional awareness), *Strategies* (limited access to emotion regulation strategies when upset), and *Clarity* (lack of emotional understanding and clarity). Scale scores are the sum of all constituent items; higher scores indicate greater difficulties. Good internal consistency and test–retest reliability has been reported (Gratz & Roemer, 2004). The DERS was translated from English to Swedish in 2013, using two independent translators (EM and main supervisor AB) and back-translation by a native English speaker (co-supervisor DC). The Swedish DERS have shown adequate psychometric properties in adults and adolescents with EDs (Monell et al., 2021; Nordgren et al., 2020). DERS is optional in Stepwise for patients ≥ 13 years.

Study I used the subscale scores in the main analyses, **Study II** used the mean Total score (i.e., Total score divided by 36), and **Study IV** used both Total and subscale scores. **Study III** used the Total score as well as the subscales that were grouped into the original four dimensions originally posited by Gratz and Roemer (2004): Awareness and Clarity were summed into the first dimension; Non-acceptance alone formed the second dimension; Goals and Impulse were summed into the third dimension; Strategies, formed the fourth dimension. In the **Studies I** and **II** comparison sample, internal consistency was good to excellent for all subscales (Cronbach's $\alpha = .81-.91$; mean $\alpha = .84$). In the **Study I** large clinical sample, it was good to excellent for all DERS subscales ($\alpha = .80-.91$; mean $\alpha = .86$) and good to excellent for all DERS dimensions in **Study III** ($\alpha = .88-.93$). In the **Study IV** sample, it was good to excellent for all initial ($\alpha = .81-.91$; mean $\alpha = .87$) and follow-up subscales ($\alpha = .89-.92$; mean $\alpha = .91$).

4.3.2 The Eating Disorder Examination Questionnaire (EDE-Q)

The EDE-Q (version 4.0; Fairburn & Beglin, 1994) measures self-rated ED symptoms in the past 28 days by 36 items scored 0-6. EDE-Q provides a Global score reflecting severity of ED psychopathology, and four subscales: *Restraint* (efforts of dietary restraint), *Eating Concern*, *Shape Concern*, and *Weight Concern* (preoccupation with eating, shape, and weight, respectively). Scale scores are the mean of constituent items; higher scores indicate greater severity. The EDE-Q also rate presence and frequency of the following behavioral symptoms: OBE, SBE, purging (self-induced vomiting, use of laxatives and diuretics), and CE with the purpose to control weight or shape. The EDE-Q has good psychometric properties (Luce &

Crowther, 1999; Mond et al., 2008); the Swedish version has satisfactory validity and reliability (Welch et al., 2011). EDE-Q is mandatory in Stepwise for patients ≥ 10 years.

Study I used the Global and subscale scores, and presence of OBE, SBE, purging (self-induced vomiting; item 21), and CE; **Study II** used the Global Score and presence of (i.e., ≥ 1 episode) OBE (item 18), SBE (item 19), any CE (item 27) and regular CE (\geq twice/week, item 28) in main analyses; and **Study III** and **IV** used the Global score. **Study III** also used presence of OBE to decide group affiliation for AN-BP and OSFED. In the **Studies I** and **II** comparison sample, internal consistency was good to excellent for all subscales (α s=.81-.91; mean α =.84). In the **Studies I** and **III** clinical sample, it was good for Restraint and Shape Concern (α s=.81, and .89), fair for Weight Concern (α =.75), and questionable for Eating Concern (α =.68; mean α =.78). In the **Study IV** sample, it was good for initial Restraint and Shape Concern (α s=.81, and .88), fair for Weight Concern (α =.76), and questionable for Eating Concern (α =.64; mean α =.770) and good to excellent for all follow-up subscales (α s=.874-.929; mean α =.880).

4.3.3 The Structural Analysis of Social Behavior introject (SASB)

The SASB intrex version (Benjamin, 2000) Swedish version 2.0 measures self-rated self-image (i.e., self-directed evaluations and behaviors) by 36 items scored 0–100 (10-point increments). SASB provides eight clusters (similar to subscales): 1) *Self-emancipation*, 2) *Self-affirmation*, 3) *Self-love*, 4) *Self-protection*, 5) *Self-control*, 6) *Self-blame*, 7) *Self-attack*, and 8) *Self-neglect* (see Figure 1). Cluster scores are the sums of all constituent items; higher scores indicate more of the measured concept. The six clusters belonging to the horizontal Affiliation Axis (i.e., clusters 2-4 and 6-8) form the Affiliation score, calculated by weighting the cluster scores according to their proximity to the Affiliation axis and dividing by the sum of the weights. SASB Affiliation score ranges from -100 – 100 where scores below zero indicate more self-directed attack and scores above zero indicate more self-directed love. The original SASB intrex has shown good reliability and internal consistency (Benjamin, 2000). The Swedish SASB intrex has shown good internal consistency (Armeliuss, unpublished manuscript, 2001). SASB is mandatory in Stepwise for patients ≥ 12 years.

Study I used the Affiliation and cluster scores in main analyses, **Study III** used the Affiliation score, and **Study IV** used the initial and follow-up Affiliation score. In the **Studies I** and **II** comparison sample, internal consistency for Affiliation score clusters was good for clusters 2, 3, and 4 (α s=.80-.86), fair for 6 and 7 (both α s=.78), and questionable for 8 (α =.65; mean α =.78). In the **Study III** clinical sample, it was good for clusters 3 and 7 (α s=.85 and .83), acceptable for 2, 4, 6 and 8 (α s=.72-.79), questionable for 5 (α =.64), and poor for 1 (α =.59; mean α =.78 for Affiliation score clusters). In the **Study IV** sample, it was good for initial Affiliation score clusters 3 and 7 (α s=.81 and .82), fair for 2, 4, and 8 (α s=.71-.76), and questionable for 6 (α =.68; fair mean α =.75) and good-excellent for all follow-up clusters (α s=.80-.92; mean α =.87).

4.3.4 Additional measures

4.3.4.1 The Comprehensive Psychopathological Rating Scale (CPRS)

The CPRS Self-rated form, Affective scales (CPRS-S-A; Svanborg & Åsberg, 1994) measures self-rated emotional symptoms during the past three days by 19 items scored 0-3 (0.5-point increments). CPRS provide three subscales: *depression*, *anxiety*, and *compulsivity*. Subscale scores are the sum of all constituent items; higher scores indicate greater severity. There are some item-overlaps between subscales. CPRS has good psychometric properties (Svanborg & Åsberg, 1994). The CPRS is mandatory in Stepwise for patients ≥ 18 years.

Study I used depression as a covariate in additional analyses; **Study IV** used anxiety as a covariate in main analyses.

4.3.4.2 The Strengths and Difficulties Questionnaire (SDQ)

The SDQ (Robert Goodman, 1997) self-report version (Goodman et al., 1998) measures psychosocial difficulties in the last six months by 25 items scored 0-2 (Not true; Somewhat true; Certainly true). SDQ provides one Total Difficulties Score and five subscales: *hyperactivity/inattention*, *emotional symptoms*, *conduct problems*, *peer problems*, and *prosocial behavior*. Subscale scores are the sums of all constituent items; higher scores indicate more of the measured concept. The original and Swedish SDQ self-report versions have shown good psychometric properties (Goodman, 2001; Hagquist, 2007). SDQ is mandatory in Stepwise for patients < 18 years.

Studies I and **IV** used emotional symptoms in analyses of sample representativeness.

4.3.4.3 The Structured Eating Disorder Interview (SEDI)

The SEDI (de Man Lapidoth & Birgegård, 2010) is a semi-structured interview developed for and used within the Stepwise system. It is used to diagnose EDs according to DSM-IV criteria at initial and follow-up assessments. The SEDI has high concordance to the well-known Eating Disorder Examination interview (de Man Lapidoth & Birgegård, 2010; Fairburn & Cooper, 1993). SEDI is mandatory in Stepwise for all patients.

Studies I, III, and **IV** used SEDI diagnostic information for the post-hoc recategorization into DSM-5 EDs. **Study IV** also used SEDI information on remission.

4.3.4.4 Body Mass Index (BMI)

BMI is calculated as weight in kg / (height in m)². For the comparison sample, information is self-reported; for patients, some are weighed at the treatment units (mainly patients with AN), but for most, height and weight are self-reported.

Studies I, III, and **IV** used BMI as a covariate.

4.3.4.5 ED duration

ED duration is based on patients' retrospective report of symptom onset in the initial registration and calculated as age minus age of onset. A minority reported onset at 0-7 years of age (<2%; 18 in **Study I/III**, four in **Study IV**). Due to the extremely low prevalence of actual EDs these ages (Nicholls et al., 2011), age of onset was adjusted to eight years for these.

Studies I and IV used ED duration as a covariate.

4.4 STATISTICAL ANALYSES

4.4.1 Mediation model

Studies II, III, and IV all included analyses of direct and indirect effects, that is, mediation analysis. Such analysis is used to examine if the association between two factors, the dependent (X) and independent variables (Y), may be influenced by a third or more factor/-s, the mediator/-s (M), that carries some or all of the association. The mediator is sometimes referred to as a mechanism. Ideally, the variables in mediation analysis should represent causal factors, that is, the independent variable affecting the mediator which in turn affects the dependent, however, it can also be used for hypothesis testing (Hayes, 2018). A conceptual model of mediation analysis is found in Figure 2. The independent and mediator variables should be associated, while there does not have to be an association between the independent and dependent variables (although there often is) as two mediators of opposing effects may obscure this association. Mediation analysis have traditionally been done by conducting several regression models in a specific order, however, there now are statistical packages performing these analyses. This thesis used the PROCESS for SPSS, Model 4 (version 2.04, Hayes, 2013; version 2.16 and 3.5, Hayes, 2018). PROCESS is based on ordinary least squares regression for models with continuous outcomes and logistic regression for dichotomous outcomes.

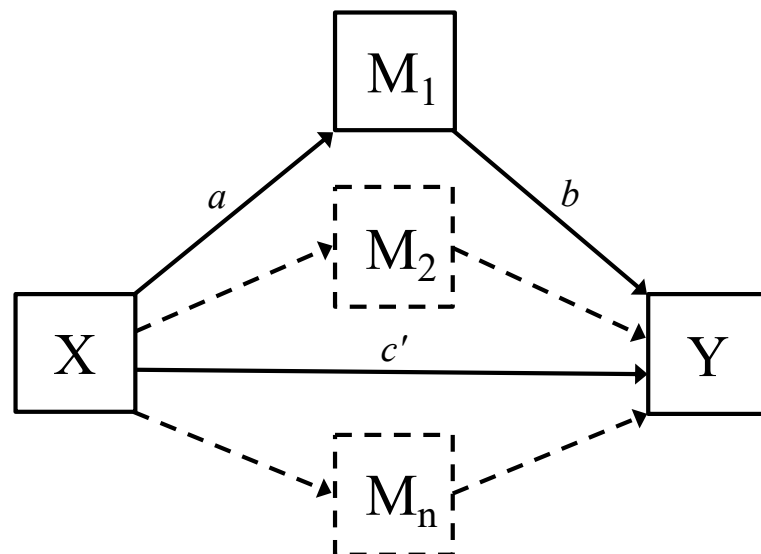


Figure 2. Conceptual model of simple and parallel mediation analysis; indirect effect of X on Y, through M. Dashed lines indicate indirect effects through multiple mediators.

Mediation analysis with one mediator, called simple mediation analysis, yields regression coefficients for each path in the model (Figure 2): X on M (path *a*), M on Y adjusted for X (path *b*), X on Y (total effect; path *c*), X on Y adjusted for M (direct effect; path *c'*), and X through M on Y which is the product of path *a* and *b* (indirect effect; path *ab*). The direct and indirect effects are of greatest importance. The significance of path *a* and *b* independently are of minor importance while their signs (positive vs. negative association) tells the direction of the indirect effect. Statistical inference is conducted for all paths in PROCESS: bias-corrected bootstrap confidence intervals (CIs; based on 10,000 bootstrap samples in this thesis) for the *ab*-path and *p*-values for all others. This thesis used simple mediation analysis in **Studies II, III, and IV**. Mediation analysis with more than one mediator (M_1 - M_n) is called parallel mediation analysis if mediators are better represented as simultaneous. Parallel mediation analysis, used in **Study III**, yields a total effect, a direct effect (adjusted for all M s), and specific indirect effects through each M (all specific indirect effects adjusted for the others).

4.4.2 Statistical analysis by study

4.4.2.1 Study I

Study I examined potential differences in emotion dysregulation between patients and the comparison sample, and between patients with different EDs. Unique associations between DERS subscales and ED symptoms were also examined in both samples. Analyses were performed using SPSS versions 22/24 for Mac. All main analyses included covariates. Analyses including comparison participants had age and BMI as covariates (two controls excluded because of missing BMI). Age and ED-duration were strongly correlated in patients ($r=.83$; $p<.001$), but only ED-duration had a unique effect on ED symptoms (results not shown), therefore analyses solely within patients had ED duration and BMI as covariates. Because of multiple testing, alpha level was set to $p<.01$ to reduce the risk of Type-I errors.

Emotion dysregulation differences were examined by analysis of covariance (ANCOVA) and post-hoc Fisher's least significant difference pairwise comparisons. Prior to analyses, three DERS univariate outliers (Z-score beyond ± 3) among controls were excluded. A multivariate ANCOVA (MANCOVA) was conducted with group as independent and DERS Total Score and subscales as multivariate dependent variables, followed by seven ANCOVAs (DERS Total and subscales) and pairwise comparisons. Effect sizes were η^2_{partial} (ANCOVAs) and Cohen's *d* (pairwise comparisons) for each significant effect. Effect sizes were considered small $\eta^2_{\text{partial}} \geq .01/d \geq .20$, medium $\eta^2_{\text{partial}} \geq .06/d \geq 0.50$, and large $\eta^2_{\text{partial}} \geq .14/d \geq .80$. Only significant pairwise comparisons with \geq medium effect sizes were reported.

Unique associations between DERS subscales and ED psychopathology (EDE-Q Global and subscales) and behavioral symptoms (OBE, SBE, self-induced vomiting, CE; 0=absence, 1=presence) were examined by hierarchical stepwise regression analyses in each sample. Prior to analyses, Mahalanobis' distances were calculated for each set of independent variables and used to exclude multivariate outliers (nine patients, three students). Covariates were forced into all models in block 1, and DERS subscales in block 2. Forward stepwise method was used in

block 2 for continuous outcomes (EDE-Q Global and subscales), and logistic regression with backward likelihood ratio method was used for categorical outcomes. Limits for entry and removal in stepwise models were adjusted to .01 and .05, respectively, to further reduce Type-I error risk. Nine regression models were examined in each sample. Depressive symptoms were additionally forced into the cognitive symptom models in supplementary analyses in patients.

4.4.2.2 Study II

Study II examined associations between emotion dysregulation, self-image, and ED symptoms. Analyses were performed using SPSS version 21 for Mac. The study used DERS Total, SASB Affiliation, and EDE-Q Global scores (continuous variables) and presence/absence of OBE, SBE, any CE, and regular CE (dichotomous variables; 0=absence, 1=presence). Correlations between these variables were calculated using Pearson's r for two continuous variables, point biserial coefficients (r_{pb}) for one continuous and one dichotomous variable, and phi coefficient (r_{ϕ}) for two dichotomous variables, all interpreted the same (small \geq .10, medium \geq .30, large \geq .50). Two potential simple mediation models were examined. All mediation analyses used unstandardized variables; the mean DERS Total score used in all analyzes (Total score divided by 36; i.e., number of constituent items). The first model posited DERS Total score as X and SASB Affiliation as M, and the second the opposite. Five model pairs with five different outcomes (Y) were examined: 1) EDE-Q Global score, 2) OBE, 3) SBE, 4) regular CE, and 5) any CE. In total, 10 models were examined. The effect size Preacher and Kelley's Kappa-squared (κ^2 ; Hayes, 2009; disabled in later PROCESS versions) was calculated for the indirect effect for the model with a continuous outcome. κ^2 ranges from 0 to 1 and is interpreted as small \geq .01, moderate \geq .09, and large \geq .25. Effect sizes for indirect effects with dichotomous outcomes was not available.

4.4.2.3 Study III

Study III aimed to replicate **Study II** findings in patients with and without OBE. Results were also extended by more fine-grained mediation models using DERS dimensions and SASB cluster scores. Analyses were performed using SPSS version 24 for Mac. Prior to analyses, Mahalanobis' distances were calculated and used to exclude multivariate outliers in each set of independent variables, in each ED group separately. There were no outliers for the simple mediation models; for the parallel mediation models, some outliers were excluded from the respective analysis in each group (≤ 2 participants/model, i.e., $<1\%$). All variables were z-standardized within each group, making path coefficients interpretable using effect size conventions for Pearson coefficients. All mediation analyses were adjusted for age and BMI. To avoid Type-I errors due to multiple testing, alpha for main analyses was set to $p<.001$ and 99% bootstrap CI:s was used for indirect effects.

First, the simple mediation model posited either DERS Total or SASB Affiliation as X or M, and EDE-Q Global as Y. They were examined in both samples separately so that four simple mediation models were examined in total. Then, four parallel mediation models posited the four DERS dimensions as X in each model, SASB Clusters 2–8 as M1–7 (Cluster 1 excluded

due to poor reliability), and EDE-Q Global as Y. All four models were examined in both ED groups separately, so that eight parallel mediation models were examined in total.

4.4.2.4 Study IV

Study IV examined if initial and one-year change in DERS, respectively, were associated with one-year ED outcome. It also explored direct and indirect associations between one-year change in DERS Total, SASB Affiliation, and EDE-Q Global score. Analyses were performed using SPSS version 25 for Mac. Paired samples t-tests and effect size (Cohen's *d*) examined overall change from initial to one-year follow-up registration in DERS Total, EDE-Q Global, and SASB Affiliation score. Change scores (Δ ; standardized regression residuals) of all DERS scales, EDE-Q Global, and SASB Affiliation score were computed by regressing follow-up values on initial values. For Δ DERS and Δ EDE-Q, positive values indicate less improvements than expected or worsening, while for Δ SASB, negative values indicate such changes. As only 158 participants had DERS at both time-points (requisite for change scores), change analyses were done in a smaller sample. Prior to analyses, Mahalanobis' distances were calculated and used to detect multivariate outliers in each set of independent variables. Models were run both with and without outliers; results excluding outliers were highly concordant and are therefore not reported. To reduce the risk of Type-I errors, significance level was set to $p < .01$ for all analyses.

Regression models in the entire sample examined one-year outcome, defined as follow-up ED psychopathology and ED remission status (logistic regression; 0=no ED, 1=ED left), respectively. Predictors were 1) initial DERS Total, 2) DERS subscales ($N=307$), 3) Δ DERS total, and 4) Δ DERS subscales ($n=158$). All models were rerun with covariates: first including initial EDE-Q Global, ED duration, and BMI (defining initial severity); then additionally including CPRS Anxiety (run separately as participants <18 years lack CPRS). Anxiety was chosen over depression as a covariate as it was most relevant for both outcomes (examined by stepwise regression with both subscales predicting each outcome, results not shown). Two simple mediation models were examined with either Δ DERS Total or Δ SASB Affiliation score as X or M, with Δ EDE-Q Global as Y in both models.

4.4.3 Clinical samples representativeness

As DERS was only administered to some potential participants, and as many lacked follow-up ratings, extensive attrition analyses were performed in the large (**Studies I and III**) and smaller (**Study IV**) clinical samples by ANOVA and χ^2 per diagnostic subgroup. Effect sizes (η^2_{partial} , Φ) were computed for significant differences ($\eta^2_{\text{partial}} \geq .01 / \Phi \geq .10$, medium $\eta^2_{\text{partial}} \geq .06 / \Phi \geq .30$, large $\eta^2_{\text{partial}} \geq .14 / \Phi \geq .50$). Differences at level $p < .05$ with \geq effect sizes close to small (i.e., within one second decimal) were considered meaningful and reported below.

4.4.3.1 Studies I and III-sample

Those with ($n=999$) and without DERS ($n=1684$) did not differ meaning-fully in EDE-Q scales or behavioral symptoms, age, ED duration, BMI, depression, or anxiety, except in two groups.

In AN-R, DERS-raters had slightly higher Shape Concerns (4.0 vs. 3.7; $F[1, 404] = 5.12$, $p=.024$; $\eta^2_{\text{partial}}=.01$); in BN, DERS-raters had slightly higher BMI (24.8 vs. 23.8; $F[1, 1032] = 9.85$, $p=.002$; $\eta^2_{\text{partial}}=.01$) and lower presence of self-rated OBE (63.4% vs. 72.4%; $\chi^2[1, N=1035] = 8.80$, $p=.003$; $\Phi = -.09$). Also, DERS was administered slightly more often in AN-R, AN-BP, and OSFED (~40% with DERS) than in BN and BED (34% and 26% with DERS, respectively); $\chi^2(4, N=2683) = 21.33$, $p<.001$, $\Phi=.09$.

4.4.3.2 Study IV-sample

Four sets of attrition analyses were performed.

1) In all potential participants, those with ($n=1989$) and without initial DERS ($n=2588$) did not differ in initial EDE-Q Global, SASB Affiliation, anxiety, emotional symptoms, age, ED duration, BMI, gender, or initial diagnoses, except in BN with slightly higher BMI in DERS-raters (25.3 vs. 24.3; $F[1, 1659] = 8.05$, $p<.001$; $\eta^2_{\text{partial}}=.01$).

2) In potential participants with follow-ups, those with ($n=307$) and without initial DERS ($n=467$; excluding those who had not passed the follow-up window) did not differ in initial characteristics (see above) or follow-up study variables (EDE-Q Global, ED remission, SASB Affiliation), anxiety, emotional symptoms, or BMI except in two groups. In OSFED, initial DERS-raters were slightly younger (22.9 vs. 24.7; $F[1, 280] = 4.10$, $p=.044$; $\eta^2_{\text{partial}}=.01$), had shorter ED duration (6.5 vs. 9.1; $F = 6.97$, $p=.009$; $\eta^2_{\text{partial}}=.02$) and lower BMI (20.5 vs. 21.4; $F = 4.74$, $p=.030$; $\eta^2_{\text{partial}}=.02$). In BN, initial DERS-raters had lower initial self-image (-18.5 vs. -7.4; $F[1, 270] = 6.85$, $p=.009$; $\eta^2_{\text{partial}}=.02$). Lastly, initial DERS-raters more often received psychotherapy with or without additional interventions (as opposed to primarily supportive therapy and/or other interventions; 57.9% vs. 35.3%; $\chi^2[2, N=753] = 51.93$, $p<.001$; $\Phi=.26$). Their psychotherapy also more often included CBT with or without other psychotherapies (75% vs. 64%) and less often psychodynamic psychotherapy (12% vs. 21%; $\chi^2[6, N=334] = 13.99$, $p=.033$; $\Phi=.20$). Groups did not differ in proportion of day- or inpatient care receivers.

3) In participants with initial DERS, those with ($n=307$) and without follow-ups ($n=1346$; excluding those who had not passed the follow-up window) did not differ in DERS scales or other initial variables (see above), except that follow-up AN-R had lower anxiety (8.4 vs. 10.2; $F[1, 182] = 4.49$, $p=.035$; $\eta^2_{\text{partial}}=.02$), follow-up OSFED lower BMI (13.3 vs. 16.6; $F[1, 657] = 10.19$, $p=.001$; $\eta^2_{\text{partial}}=.02$), and follow-up BED lower DERS Impulse (13.3 vs. 16.6; $F[1, 72] = 4.48$, $p=.038$; $\eta^2_{\text{partial}}=.06$).

4) In the final sample, participants with ($n=158$) and without follow-up DERS ($n=149$) did not differ in initial and follow-up variables (including treatment characteristics, see above) except in AN-R where those with follow-up DERS had lower DERS Non-acceptance (14.1 vs. 19.1; $F[1, 47] = 8.02$, $p=.007$; $\eta^2_{\text{partial}}=.15$), lower Strategies (16.6 vs. 22.4; $F = 7.32$, $p=.009$; $\eta^2_{\text{partial}}=.13$), and lower initial anxiety (6.6 vs. 9.7; $F[1, 31] = 4.67$, $p=.039$; $\eta^2_{\text{partial}}=.13$).

4.5 ETHICAL CONSIDERATIONS

The female university student comparison participants in **Studies I** and **II** were adults for whom participation was clearly voluntary and all participants provided informed consent. Even so, they invested time and effort by participating. Also, some questionnaires queried about severe psychiatric symptoms (e.g., ED symptoms, self-harm, autistic traits) and themes that might elicit questions, concern and/or worry. In such instances, participants were encouraged to contact the principal investigator (main supervisor AB) or the clinical psychology student conducting the data collection (EM). Contact details were provided with the questionnaires, and both of them were able to answer questions and direct participants to psychiatric and/or medical assessment and/or care if needed. No participant got in touch with us

The clinical participants in **Studies I, III, and IV** were patients in specialized ED treatment and their data routinely collected as part of standard assessments at their treatment units through the Stepwise system. As such, they did not invest extra time and effort for participation in these particular studies, and any potential questions, concern and/or worry elicited by the instruments could be managed by clinicians performing the assessments. However, this also meant that they did not specifically choose to participate in these studies. Although all included participants (legal guardians for younger patients) had given general permission for their data potentially being used in research, they were not able to choose which kind of research they approved of. Additionally, there might have been participants who were reluctant to decline research permission, potentially by expecting some negative impact on their treatment. Even so, there were patients who did decline research permission, hopefully indicating that the voluntary nature of such was adequately communicated. Besides the utility of the thorough Stepwise assessments for the treatment of each individual patient, using this kind data may be regarded as making additional use of the time and effort invested by both patients and clinicians with their data benefitting the larger ED population. Therefore, it is important to respectfully interpret and communicate results so as not to inadvertently preserve stereotypes or stigmatize those affected by psychiatric disorders in general and by EDs in particular. Also, it is important to communicate that results in these studies may not be representative of EDs outside of specialized treatment or of underrepresented groups such as males.

All thesis data was handled with confidentiality, data sets were pseudonymized without any personal data, and adequate secure storage procedures were ensured. Results are only reported on an aggregated group level and no individual participants are recognizable. The four studies were approved by the Stockholm regional ethics committee (2013/243-31/3; 2015/928-31/4).

5 RESULTS

5.1 STUDY I

Study I examined potential differences in emotion dysregulation between female patients with EDs and female students as comparison participants, between patients with different EDs, and unique associations between emotion dysregulation aspects and different ED symptoms.

5.1.1 Sample characteristics

Comparison between clinical and comparison participants showed some differences in age ($F[5, 1,245] = 17.36, p < .001$) and BMI ($F[5, 1243] = 193.12, p < .001$). Comparison participants were younger than those with BN and BED and older than AN-R, with higher BMI than those with AN and OSFED and lower than BN and BED. Patient age ranged between 16-72, those with AN-R were youngest with shortest ED duration, and BED oldest with longest duration.

Table 2. Descriptive characteristics of Study I variables in comparison participants and in each ED diagnostic subgroup.

	Comparison (n=252)	AN-R (n=172)	AN-BP (n=64)	BN (n=350)	BED (n=40)	OSFED (n=373)
Age	23.7 (3.6)	21.8 (7.0)	24.4 (6.3)	26.2 (8.4)	32.3 (11.3)	24.1 (8.3)
BMI	22.4 (3.7)	16.0 (1.5)	16.3 (1.3)	24.8 (5.4)	34.2 (6.8)	21.4 (4.1)
ED duration		5.6 (6.5)	8.6 (6.7)	10.7 (8.6)	16.2 (11.4)	8.0 (8.4)
EDE-Q Global	1.6 (1.2)	3.2 (1.5)	3.9 (1.3)	4.1 (1.0)	3.6 (.9)	3.9 (1.2)
OBE	18.7%	20.3%	45.3%	63.4%	85.0%	37.8%
SBE	24.2%	51.7%	65.6%	56.9%	30.0%	66.0%
Purging	4.4%	7.0%	62.5%	64.0%	5.0%	38.1%
CE	35.7%	36.6%	35.9%	48.6%	7.5%	56.6%
DERS Total	82.4 (21.2)	101.3 (26.6)	105.3 (24.8)	103.9 (26.4)	105.3 (22.7)	100.0 (26.7)
Non-acceptance	13.1 (5.0)	16.0 (6.0)	17.4 (6.6)	16.2 (6.2)	17.7 (6.8)	16.2 (6.2)
Goals	16.2 (5.0)	16.5 (5.5)	16.5 (4.9)	17.0 (5.2)	17.4 (5.1)	16.2 (5.6)
Impulse	12.7 (4.9)	14.1 (6.2)	14.3 (6.0)	15.2 (6.2)	16.7 (6.1)	13.9 (6.1)
Awareness	12.9 (4.0)	18.1 (5.3)	19.3 (4.9)	18.6 (5.5)	18.1 (5.5)	18.1 (5.1)
Strategies	17.0 (6.8)	20.7 (7.8)	21.7 (6.8)	22.0 (7.6)	22.1 (6.8)	20.9 (7.8)
Clarity	10.5 (3.6)	14.9 (4.9)	15.1 (4.7)	14.2 (4.6)	12.8 (4.4)	13.9 (4.7)

Note: AN-BP = anorexia nervosa binge/purge subtype; AN-R = AN restrictive subtype; BED = binge eating disorder; BMI = body mass index; BN = bulimia nervosa; CE = compulsive exercise; DERS = Difficulties in Emotion Regulation Scale; ED = eating disorder; EDE-Q = Eating Disorder Examination Questionnaire; OBE = objective binge-eating episode; OSFED = other specified ED; SBE = subjective binge-eating episode

5.1.2 Differences in emotion dysregulation

Participants with EDs were compared to comparison participants and each other in emotion dysregulation (DERS scales; group subscale sums depicted in Figure 3). There were small significant multivariate between-group differences adjusted for age and BMI ($F[35, 6,180] = 8.95, p < .001; \eta^2_{\text{partial}} = .048$). Univariate analyses showed significant differences ($ps < .001$) in all DERS scales but Goals, with small to large effect sizes (only significant effects with \geq effect sizes reported). Compared with the comparison group, all EDs scored higher DERS Total ($ds = 0.65-1.01$), Non-acceptance ($ds = 0.53-0.79$), Awareness ($ds = 0.97-1.27$), Strategies ($ds = 0.51-0.70$), and Clarity ($ds = 0.73-0.91$; all $ps < .001$). ED groups did not meaningfully differ

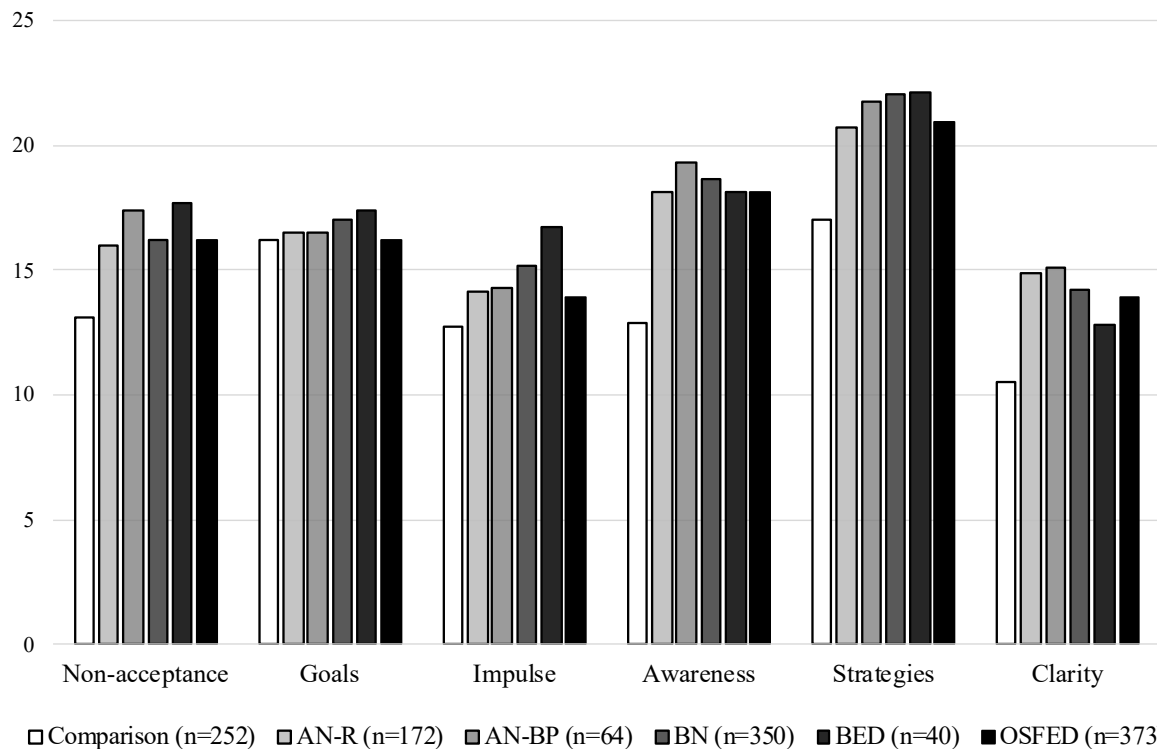


Figure 3. DERS subscale scores for the comparison group and each ED group.

from the comparison group in Goals (small effects), and only participants with BED scored meaningfully higher on Impulse than controls ($d=0.86$, $p<.001$). There were no meaningful differences between EDs diagnoses in DERS, except that participants with BED scored higher on Impulse than participants with AN-R, AN-BP, and OSFED ($ds=.60-.65$; $ps<.01$).

5.1.3 Unique associations between emotion dysregulation and ED psychopathology

All final stepwise regression models for ED psychopathology (EDE-Q Global and subscales) were significant in both patients and comparison participants ($ps<.001$) where higher emotion dysregulation was associated with higher psychopathology (adjusted for covariates; step 1). Among patients, for EDE-Q Global Score (see Table 3), Strategies (step 2), Awareness (step 3), and Non-acceptance (step 4) emerged as significant predictors (23% explained variance). Strategies also showed strongest unique association with pathology in all subscale models ($\beta s=.227-.348$; $ps<.001$), with Awareness and Non-acceptance as additional predictors in Eating and Shape concerns models ($\beta s=.089-.194$; $ps<.01$; 23% and 27% explained variance) and Awareness only in Weight concerns and Restraint models ($\beta s=.126$ and $.097$; $ps<.01$; 24% and 9% explained variance). In analyses additionally adjusted for depression, only Non-acceptance was uniquely associated with the Global score and Eating concern ($\beta s=.087$ and $.154$; $ps<.01$) and Strategies with Shape and Weight concern ($\beta s=.114$ and $.112$; $ps<.01$).

In comparison participants, Strategies (step 2) and Clarity (step 3) significantly predicted EDE-Q Global (25% explained variance; Table 3). Strategies also showed the strongest unique association with pathology in all subscale models ($\beta s=.222-.310$; $ps<.01$) and was the only predictor in Restraint and Eating Concern models (10% and 14% explained variance). Non-

Table 3. Stepwise regression results, using DERS subscales to predict ED psychopathology and behavioral symptoms controlled for, and over and above covariates (ED duration and BMI in clinical sample, age and BMI in comparison sample)

Model/predictors	Clinical group					Comparison group				
	$\beta / B (SE)$	$t / Wald$	p	OR	R^2	$\beta / B (SE)$	$t / Wald$	p	OR	R^2
EDE-Q Global			<.001					<.001		
Strategies	.300	8.42	<.001			.274	4.31	<.001		
Awareness	.128	4.37	<.001			-	-	-		
Clarity	-	-	-			.187	2.94	.004		.245
Non-acceptance	.121	3.44	.001		.234					
OBE			<.001							
Impulse	.041 (.011)	13.95	<.001	1.041	.089	-	-	-	-	
Strategies	-	-	-	-		.097 (.026)	14.10	<.001	1.102	.099
SBE			.002					.002		
Non-acceptance	.038 (.011)	12.70	<.001	1.039	.015	-	-	-	-	
Impulse						.072 (.034)	4.59	.032	1.075	
Clarity						.104 (.045)	5.31	.021	1.110	.068
Compulsive exercise			.003					.114		
Goals	-.046 (.016)	8.15	.004	.955		-	-	-	-	
Impulse	.031 (.014)	5.04	.025	1.032	.016	.057 (.027)	4.35	.037	1.059	.024

Note: BMI = body mass index; DERS = Difficulties in Emotion Regulation Scale; ED = eating disorder; EDE-Q = Eating Disorder Examination Questionnaire; OBE = objective binge-eating episode; SBE = subjective binge-eating episode

acceptance was an additional predictor in Shape concern (β s=.227; p =.001; 30% explained variance) and Clarity in Weight Concern model (β =.211; p =.001; 25% explained variance).

5.1.4 Unique associations between emotion dysregulation and ED behavioral symptoms

Most models were significant (ps <.01; see Table 3), but the purging model did not include any DERS scales, neither in patients nor comparison participants. In patients, Impulse was uniquely and positively associated with OBE such that a 1-point increase in Impulse indicated 4.1% higher odds of OBE presence. Non-acceptance was uniquely and positively associated with SBE (3.9% higher odds). Goals was uniquely and negatively associated with CE such that higher scores indicated 4.5% lower odds for CE presence. Explained variances were below 9%. In supplementary analyses examining unique associations between DERS scales and symptom frequency (using zero-inflated negative binomial regression in STATA for Mac), only Non-acceptance was uniquely associated with SBE frequency (B =.016; p =.008).

In comparison participants, only the final model for OBE included DERS and was significant, where Strategies had a unique positive association with OBE (10.2% higher odds). Explained variance was under 10%. The SBE model was significant but did not include DERS, and the model for CE was not significant.

5.1.5 Conclusions

Emotion dysregulation distinguished female patients with EDs from a female university student comparison sample, with patients generally reporting higher emotion dysregulation, particularly higher difficulties in emotional awareness and clarity. Emotion dysregulation seemed a primarily transdiagnostic trait, except that patients with BED reported higher

difficulties in impulse control than those with AN and OSFED. Emotion dysregulation further showed distinct associations with ED symptoms. Higher perceived lack of emotion regulation strategies was uniquely associated with ED psychopathology in both patients and controls, and with binge-eating in controls. In patients, higher difficulties in impulse control and emotional non-acceptance showed unique associations with binge-eating, while lower difficulties in goal-directed behavior was associated with CE. Overall, associations with ED psychopathology were more pronounced than associations with behavioral symptoms. Emotion dysregulation seemed primarily associated with behavioral symptom presence as opposed to frequency.

5.2 STUDY II

Study II examined associations between emotion dysregulation, self-image, and ED symptoms in the female university students (i.e., **Study I** comparison sample).

5.2.1 Correlations between emotion dysregulation, self-image, and ED symptoms

Descriptive statistics and correlations between emotion dysregulation, self-image, and ED symptoms are reported in Table 4. Emotion dysregulation and self-image correlated strongly, and both correlated moderately with ED psychopathology (EDE-Q Global score). Only OBE and SBE correlated significantly with emotion dysregulation and self-image.

Table 4. Descriptive statistics and intercorrelations between Study II variables.

	<i>M (SD)</i>	<i>N (%)</i>	EDE-Q	DERS	SASB	OBE	SBE	Any CE
EDE-Q	1.7 (1.2)							
DERS	82.4 (21.2)		.391***					
SASB	41.9 (29.5)		-.462***	-.717***				
OBE		47 (18.7%)	.486***	.257***	-.317***			
SBE		61 (24.2%)	.532***	.212**	-.266***	.441***		
Any CE		90 (35.7%)	.323***	.027	-.087	.071	.178**	
Regular CE		47 (18.7%)	.290***	.096	-.036	.029	.130*	.642***

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

CE = compulsive exercise; DERS = Difficulties in Emotion Regulation Scale (Total score); EDE-Q = Eating Disorder Examination Questionnaire (Global Score); OBE = objective binge-eating episode; SASB = Structural Analysis of Social Behavior (Affiliation Score); SBE = subjective binge-eating episode

5.2.2 Direct and indirect associations between emotion dysregulation, self-image, and ED symptoms

Mediation analyses examined direct and indirect associations between emotion dysregulation (mean DERS Total) and self-image (SASB Affiliation) as either independent or mediator variable in relation to five ED symptoms as dependent variables. Emotion dysregulation was indirectly associated with ED psychopathology through self-image, such that that higher emotion dysregulation was associated with a more negative self-image, in turn associated with higher ED psychopathology (depicted in Figure 4). The indirect effect had a medium effect size (path *ab*: $\kappa^2 = .204$). To improve interpretability, standardized path coefficients were computed by separate regression analyses and presented in Figure 4.

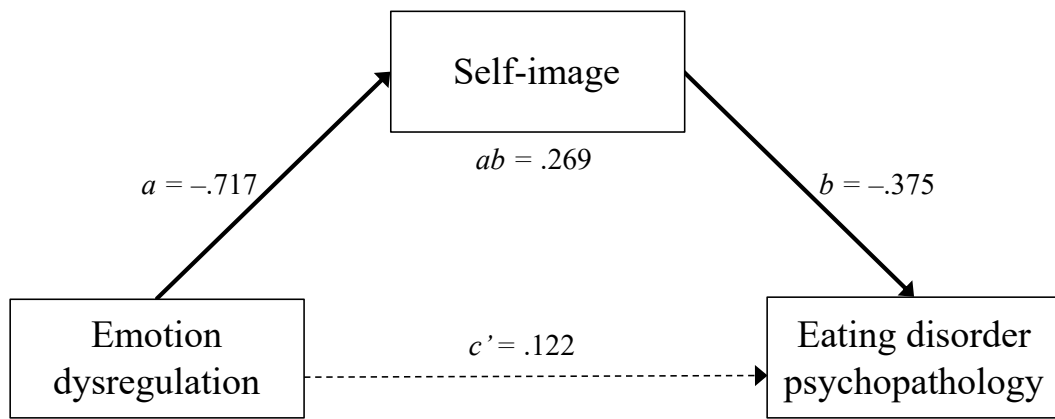


Figure 4. The indirect association between emotion dysregulation and ED psychopathology through self-image with standardized path coefficients.

Similarly, emotion dysregulation was also indirectly associated with OBE and SBE through self-image (CI:s completely above zero), where higher emotion dysregulation was associated with a more negative self-image, in turn associated with presence of OBE and SBE, respectively (unstandardized path coefficients for all models presented in Table 5). Emotion dysregulation showed no significant total, direct, or indirect association with CE. All indirect effect CI:s in models positing self-image as independent and emotion dysregulation as mediator included zero (see Table 5)¹. Self-image was directly associated with ED psychopathology, and with presence of OBE and SBE, but not with CE.

Table 5. Unstandardized mediation model summary statistics for models positing emotion dysregulation and self-image as either independent or mediating variable in relation to five different ED pathology variables as dependent variables. Path coefficients are expressed in the metric of the dependent variable (except path *a*, expressed in the metric of the mediator).

Outcome	Path <i>a</i>	Path <i>b</i>	Total effect (<i>c</i>)	Indirect effect (<i>ab</i>)	95% CI	Direct effect (<i>c'</i>)
<i>Pathway 1 (DERS -> SASB -> EDE-Q)</i>						
EDE-Q Global	−36.229***	−.015***	.810***	.558	.304 - .802	.253
OBE	−36.227***	−.023**	1.082***	.840	.315 - 1.462	.252
SBE	−36.159***	−.018*	.822**	.659	.133 - 1.241	.166
Any CE	−36.229***	−.003	.343	.095	−.342 - .563	.248
Regular CE	−36.229***	−.003	.117	.109	−.391 - .626	.007
<i>Pathway 2 (SASB -> DERS -> EDE-Q)</i>						
EDE-Q Global	−.014***	.253	−.019***	−.004	−.009 - .001	−.015***
OBE	−.014***	.252	−.027***	−.004	−.015 - .007	−.023**
SBE	−.014***	.166	−.021***	−.002	−.013 - .008	−.018*
Any CE	−.014***	.248	−.006	−.004	−.013 - .006	−.003
Regular CE	−.014***	.007	−.003	<−.001	−.010 - .011	−.003

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

CE = compulsive exercise; CI = confidence interval; DERS = Difficulties in Emotion Regulation Scale (Total score); ED = eating disorder; EDE-Q = Eating Disorder Examination Questionnaire (Global Score); OBE = objective binge-eating episode; SASB = Structural Analysis of Social Behavior (Affiliation Score); SBE = subjective binge-eating episode

¹ Corresponding tables and figures in the **Study II** article were calculated using SASB Affiliation scores divided by 10 (i.e., range −10 – 10). Table 5 instead report statistics using the actual Affiliation score (i.e., −100 - 100). Therefore, path coefficients differ with pathway 1 *a*-paths being 10 times larger, and pathway 1 *b*-paths and pathway 2 *a*-, *c*-, and *c'*-paths 10 times smaller in Table 5 compared to their article counterparts. Significance and interpretation of the results is however equal as the effects are unrelated to any variable transformation.

5.2.3 Conclusions

In these female university students, higher emotion dysregulation and more negative self-image were strongly associated, and independently, both were associated with ED psychopathology and binge-eating, but not with CE. When examined concurrently, a clear pattern emerged where self-image remained associated with ED psychopathology and binge-eating while emotion dysregulation was only indirectly associated with symptoms through self-image.

5.3 STUDY III

Study III aimed to replicate the main mediation model from **Study II** in female patients with and without OBE. Results were also extended by more fine-grained mediation models using emotion dysregulation dimensions and self-image aspects.

5.3.1 Sample characteristics

Participants were categorized into EDs with or without OBE. Compared to participants with OBE, those without were significantly younger (23.5 vs. 25.8 years), had shorter ED duration (7.5 vs. 10 years; both small effects), and lower BMI than those with OBE (18.8 vs. 24.3; large effect). For study variables EDE-Q, SASB and DERS (see Table 6), compared to participants with OBE, those without reported lower EDE-Q (medium effect), higher self-affirmation, lower self-neglect, higher overall Affiliation, lower difficulties in goal-directed behavior and

Table 6. Descriptive statistics for Study III variables in EDs without OBE ($n = 439$) and EDs with OBE ($n = 560$) with independent t-test comparisons. Effect sizes (Cohen's d) computed for $p < .01$ differences.

Variable	Non-OBE EDs <i>M</i> (<i>SD</i>)	OBE EDs <i>M</i> (<i>SD</i>)	<i>t</i>	<i>p</i>	<i>d</i>
EDE-Q Global	3.5 (1.4)	4.2 (1.0)	-8.71	<.001	0.55
DERS dimensions:					
1. Awareness/Clarity	32.4 (8.8)	32.6 (8.7)	-0.36	.723	
2. Non-acceptance	15.9 (6.2)	16.6 (6.3)	-1.75	.081	
3. Goals/Impulse	29.6 (10.5)	32.3 (10.4)	-3.97	<.001	0.25
4. Strategies	20.3 (7.8)	22.2 (7.6)	-3.72	<.001	0.24
DERS Total	98.3 (26.8)	103.7 (26.1)	-3.18	.002	0.20
SASB clusters:					
1. Self-emancipation	30.4 (17.4)	32.3 (16.2)	-1.80	.072	
2. Self-affirmation	32.2 (21.9)	27.8 (18.2)	3.45	.001	0.22
3. Self-love	32.2 (21.2)	29.00 (18.2)	2.54	.011	
4. Self-protection	42.4 (21.0)	39.7 (19.2)	2.11	.035	
5. Self-control	59.8 (17.6)	55.4 (18.1)	3.81	<.001	0.24
6. Self-blame	56.5 (24.6)	59.2 (22.7)	-1.81	.071	
7. Self-attack	41.0 (26.0)	44.7 (23.8)	-2.34	.019	
8. Self-neglect	36.6 (22.5)	42.3 (21.6)	-4.09	<.001	0.26
SASB Affiliation	-9.2 (39.4)	-16.4 (34.0)	3.16	.002	0.20

Note: DERS = Difficulties in Emotion Regulation Scale; ED = eating disorder; EDE-Q = Eating Disorder Examination Questionnaire; OBE = objective binge-eating episode; SASB = Structural Analysis of Social Behaviors

impulse control when upset, less perceived lack of emotion regulation strategies when upset, and lower overall emotion dysregulation (small effects).

5.3.2 Simple mediation models

Simple mediation analyses sought to replicate **Study II** findings where emotion dysregulation (DERS Total) was indirectly associated with ED psychopathology (EDE-Q Global) through self-image (SASB Affiliation). This model was replicated in both groups where higher emotion dysregulation was associated with a more negative self-image, in turn associated with higher ED psychopathology (Table 7). Emotion dysregulation had no significant direct association with ED psychopathology. Descriptively, associations were slightly stronger in non-OBE than OBE EDs. There was no evidence of the alternate indirect association; self-image had a significant strong direct association with ED psychopathology in both samples, whereas indirect effects through emotion dysregulation were negligible (CI:s including zero; Table 7).

Table 7. Standardized mediation model summary statistics in EDs with or without OBE for models positing emotion dysregulation and self-image as either independent or mediating variable in relation to ED psychopathology as dependent.

Group	Path <i>a</i>	Path <i>b</i>	Total effect (<i>c</i>)	Indirect effect (<i>ab</i>)	99% CI	Direct effect (<i>c'</i>)
<i>Hypothesized pathway (DERS -> SASB -> EDE-Q)</i>						
Non-OBE EDs	-.718***	-.631***	.451***	.453	.351 – .564	-.002 (n.s.)
OBE EDs	-.654***	-.479***	.417***	.313	.221 – .419	.104*
<i>Alternative pathway (SASB -> DERS -> EDE-Q)</i>						
Non-OBE EDs	-.709***	-.002 (n.s.)	-.630***	.002	-.089 – .095	-.631***
OBE EDs	-.652***	.104*	-.547***	-.068	-.152 – .013	-.479***

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

CI = confidence interval; DERS = Difficulties in Emotion Regulation Scale; ED = eating disorder; EDE-Q = Eating Disorder Examination Questionnaire; OBE = objective binge-eating episode; SASB = Structural Analysis of Social Behavior

5.3.3 Multiple parallel mediation models in participants without OBE

All four models (i.e., each DERS dimension) were significant ($ps < .001$; $R^2s = .46$). DERS dimensions and most SASB clusters showed significant moderate-strong associations (*a*-paths), whereas there were only a few small significant associations between SASB clusters and ED psychopathology when adjusting for DERS (*b*-paths). Each model contained one or more indirect effect with a CI completely above or below zero (these path coefficients in Figure 5). In the Awareness/Clarity-model, higher difficulties in emotional awareness and clarity were indirectly associated with higher ED psychopathology through lower self-love and higher self-attack. In the Non-acceptance-model, higher emotional non-acceptance was indirectly associated with higher ED psychopathology through lower self-love, higher self-control, and higher self-attack. In the Goals/Impulse-model, higher difficulties maintaining impulse control and goal-directed behaviors when in distress were indirectly associated with higher ED psychopathology through lower self-love and higher self-attack. Lastly, in the Strategies-model, higher perceived lack of emotion regulation strategies was indirectly associated with higher ED psychopathology through higher self-attack. No DERS dimension was directly associated with ED psychopathology ($\beta s = -.013-.037$; $ps > .40$).

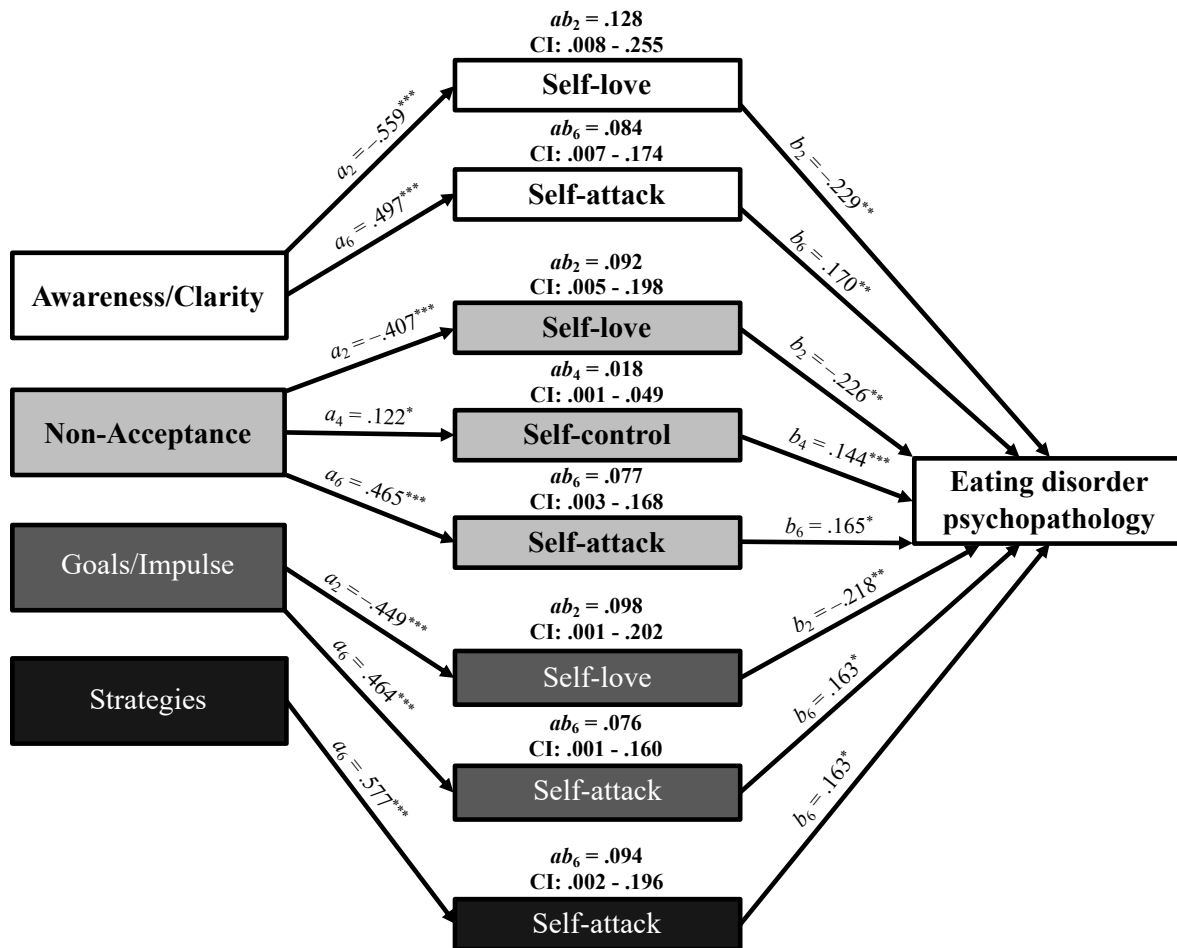


Figure 5. Indirect associations between four emotion dysregulation dimensions (examined in separate analyses) and ED psychopathology through seven aspects of self-image in participants without OBE. All analyses included seven mediators (SASB clusters 2-8). For simplicity, only paths for indirect effects with CI:s completely above or below zero are depicted; * $p < .05$, ** $p < .01$, *** $p < .001$.

5.3.4 Multiple parallel mediation models in participants with OBE

As above, all models were significant ($ps < .001$; $R^2s = .34$), most a -paths were significant and moderate while most b -paths were significant and small. Each model contained two or more indirect effects with a CI completely above or below zero (these path coefficients in Figure 6). In the Awareness/Clarity-model, higher difficulties in emotional awareness and clarity were indirectly associated with higher ED psychopathology through lower self-affirmation and higher self-blame. In the Non-acceptance-model, higher emotional non-acceptance was indirectly associated with higher ED psychopathology through lower self-affirmation, lower self-love, higher self-control, higher self-blame, and higher self-neglect. In the Goals/Impulse-model, higher difficulties maintaining impulse control and goal-directed behaviors when in distress were indirectly associated with higher ED psychopathology through lower self-affirmation and higher self-blame. Lastly, in the Strategies-model, higher perceived lack of emotion regulation strategies was indirectly associated with higher ED psychopathology through lower self-affirmation and higher self-blame. No DERS dimension had a significant direct effect on ED psychopathology ($\beta s = -.033-.076$; $ps > .05$).

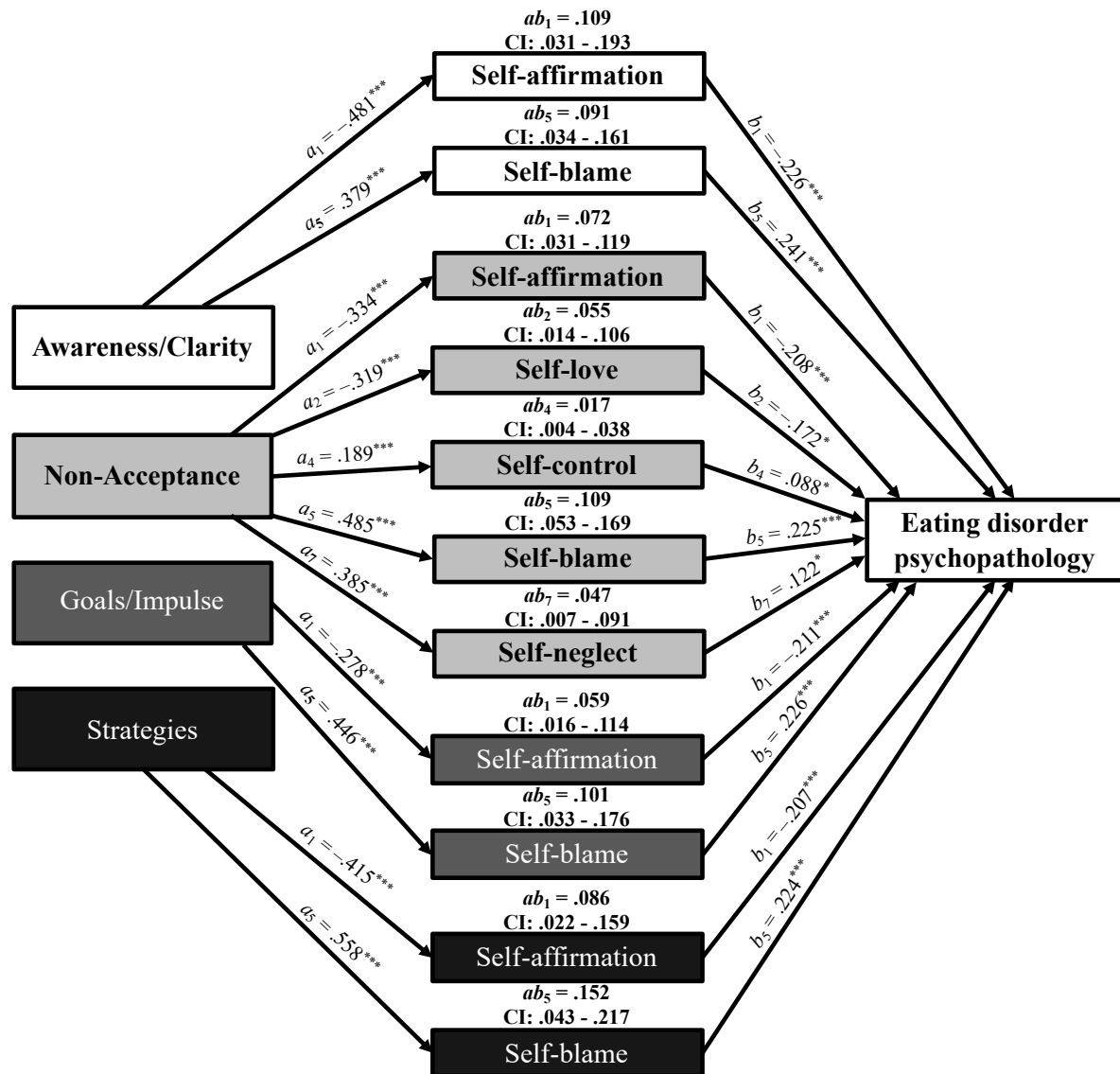


Figure 6. Indirect associations between four emotion dysregulation dimensions (examined in separate analyses) and ED psychopathology through seven aspects of self-image in participants with OBE. All analyses included seven mediators (SASB clusters 2-8). For simplicity, only paths for indirect effects with CI:s completely above or below zero are depicted; * $p < .05$, ** $p < .01$, *** $p < .001$.

5.3.5 Conclusions

The **Study II** mediation model was replicated in female patients with EDs with or without OBE. Emotion dysregulation was strongly associated with negative self-image in both groups, and independently, both were moderately (emotion dysregulation) and strongly (self-image) associated with ED psychopathology, in line with findings in the **Study I** female comparison sample. Associations were generally slightly stronger in these clinical samples compared to the comparison sample, and slightly stronger in participants without OBE. The more fine-grained analyses (i.e., parallel mediation models) showed differentiating indirect effects. In participants without OBE, mediators were mainly lower self-love and higher self-attack, while in those with OBE, mediators mainly included lower self-affirmation, higher self-blame, and higher self-

neglect. Although mediators differed between groups, they were similar for the four different emotion dysregulation dimensions within each group.

5.4 STUDY IV

Study IV examined if initial and one-year change in emotion dysregulation, respectively, were associated with one-year ED outcome. It also explored direct and indirect associations between one-year change in emotion dysregulation, self-image, and ED psychopathology.

5.4.1 Sample characteristics and one-year change in ED psychopathology, self-image, and emotion dysregulation

At one-year follow-up, more than half were in remission, with highest remission rate in BED and lowest in AN-BP (initial and follow-up descriptive statistics, see Table 8). Participants showed significant and large raw score improvements in mean ED psychopathology ($M [SD] = -1.65 [1.49]$, $t = -19.46$, $p < .001$; $d = 1.25$), as well as significant and medium improvements in self-image ($M [SD] = 33.27 [39.35]$, $t = 14.76$, $p < .001$; $d = 0.71$) and emotion dysregulation ($M [SD] = -15.16 [27.77]$, $t = -7.40$, $p < .001$; $d = 0.59$). At diagnostic group level, all showed mean improvements, except in AN-BP with higher mean emotion dysregulation at follow-up.

Table 8. Descriptive statistics for Study IV variables at initial registration and one-year follow-up.

	All (N=307)	AN-R (n=50)	AN-BP (n=15)	BN (n=104)	BED (n=19)	OSFED (n=119)
Initial	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Age	24.5 (8.3)	21.7 (7.9)	22.8 (6.8)	26.6 (8.3)	31.5 (10.0)	22.8 (7.2)
ED duration	8.2 (8.1)	6.0 (7.3)	6.3 (7.7)	10.6 (8.3)	13.9 (10.1)	6.5 (7.1)
BMI	21.9 (6.0)	16.3 (1.4)	16.2 (1.2)	24.9 (5.8)	33.8 (6.5)	20.5 (2.8)
EDE-Q Global	3.9 (1.1)	3.3 (1.3)	3.9 (1.2)	4.2 (1.0)	3.5 (1.0)	4.0 (1.1)
SASB Affiliation	-14.4 (33.0)	-5.1 (37.5)	-13.5 (38.3)	-18.5 (34.3)	-18.3 (25.1)	-14.1 (29.9)
DERS Total	101.8 (25.5)	98.7 (28.4)	100.0 (30.0)	103.9 (23.3)	96.6 (18.8)	102.4 (26.4)
Follow-up						
No ED (<i>n</i> ; %)	172 (52.3%)	22 (44.0%)	5 (33.3%)	62 (59.6%)	16 (84.2%)	59 (49.6%)
BMI	23.1 (5.6)	18.9 (2.5)	18.6 (1.9)	25.1 (5.9)	34.2 (5.8)	22.0 (3.0)
EDE-Q Global	2.3 (1.6)	1.9 (1.6)	3.1 (1.6)	2.3 (1.6)	2.2 (1.3)	2.3 (1.6)
SASB Affiliation	18.8 (44.9)	23.1 (48.9)	-0.3 (45.4)	18.2 (46.1)	19.8 (39.0)	19.9 (43.1)
DERS Total	87.6 (29.6)	81.6 (26.9)	113.5 (22.7)	90.2 (29.1)	71.7 (19.3)	87.6 (31.5)
DERS valid <i>n</i>	158	24	6	57	10	61

Note: AN-BP / R = anorexia nervosa binge/purge or restrictive subtype; BED = binge eating disorder; BMI = body mass index; BN = bulimia nervosa; DERS = Difficulties in Emotion Regulation Scale; ED = eating disorder; EDE-Q = Eating Disorder Examination Questionnaire; OSFED = other specified feeding and EDs; SASB = Structural Analysis of Social Behaviors

5.4.2 Prediction of follow-up ED psychopathology and remission

Higher initial global emotion dysregulation (i.e., DERS Total) was weakly associated with higher follow-up ED psychopathology (i.e., EDE-Q Global; Table 9), but this association did not remain in models adjusted for initial clinical severity. Initial DERS Total showed no significant association with remission status. No individual initial DERS subscale showed

Table 9. Prediction of ED psychopathology at follow-up and of remission (0=no ED; 1=still ED) at follow-up, respectively, by initial DERS Total score ($N=307$) and change in DERS Total score (Δ Total score; standardized regression residuals; $n=158$). Positive OR = increased risk of still being ill; negative OR = decreased risk of still being ill.

	$\beta / B (SE)$	$t / Wald$	p	OR	R^2
<i>Outcome = follow-up EDE-Q Global</i>					
Initial DERS Total score	.171	3.01	.003		.029
Δ DERS Total score	.531	7.82	<.001		.282
<i>Outcome = remission status</i>					
Initial DERS Total score	-.004 (<.01)	0.82	.366	.996	.003
Δ DERS Total score	.882 (.20)	18.90	<.001	2.416	.139

Note: DERS = Difficulties in Emotion Regulation Scale; ED = eating disorder; EDE-Q = Eating Disorder Examination Questionnaire; OR = odds ratio; SASB = Structural Analysis of Social Behavior

significant unique associations with follow-up EDE-Q Global or remission status (results not shown). Change in global emotion dysregulation (i.e., Δ DERS) was strongly associated with follow-up EDE-Q Global, such that less improvement than expected (i.e., positive scores) indicated higher follow-up EDE-Q Global (Table 9). This association remained significant with similar strength when adjusted for initial clinical severity and when additionally adjusted for anxiety. Change in global Δ DERS was also associated with remission status, such that less improvement than expected indicated increased risk of still having a follow-up ED (Table 9). This association remained with similar odds-ratios in adjusted models. No Δ DERS subscale was uniquely associated with follow-up ED psychopathology or remission (results not shown), although Δ Awareness and Δ Strategies both showed trend-significant associations with follow-up ED psychopathology ($\beta=.187$, $p=.042$ and $\beta=.238$, $p=.052$, respectively), with the Δ Awareness association being similar in adjusted models.

5.4.3 Direct and indirect associations between one-year change in emotion dysregulation, self-image, and ED psychopathology

All change variables were significantly associated with each other when examined separately, where less improvement than expected or worsening in either emotion dysregulation or self-image was significantly associated with less improvement or worsening in ED psychopathology (paths c , Table 10), indicated in pathway 1 by a positive association between Δ DERS and Δ EDE-Q, and in pathway 2 by a negative association between Δ SASB and Δ EDE-Q. Less improvement/worsening in emotion dysregulation was also significantly associated with less improvement/worsening in self-image (paths a ; Table 10), indicated by negative associations between Δ SASB and Δ DERS.

Table 10. Standardized mediation model summary statistics for models positing Δ emotion dysregulation and Δ self-image as either independent or mediating variable in relation to Δ ED psychopathology as dependent.

Path a	Path b	Total effect (c)	Indirect effect (ab)	99% CI	Direct effect (c')
<i>Pathway 1 (ΔDERS \rightarrow ΔSASB \rightarrow ΔEDE-Q)</i>					
-.645***	-.674***	.606***	.435	.274 - .610	.171*
<i>Pathway 2 (ΔSASB \rightarrow ΔDERS \rightarrow ΔEDE-Q)</i>					
-.719***	.171*	-.797***	-.123	-.287 - .029	-.674***

Note: * $p<.05$, ** $p<.01$, *** $p<.001$

CI = confidence interval; DERS = Difficulties in Emotion Regulation Scale; EDE-Q = Eating Disorder Examination Questionnaire; SASB = Structural Analysis of Social Behavior

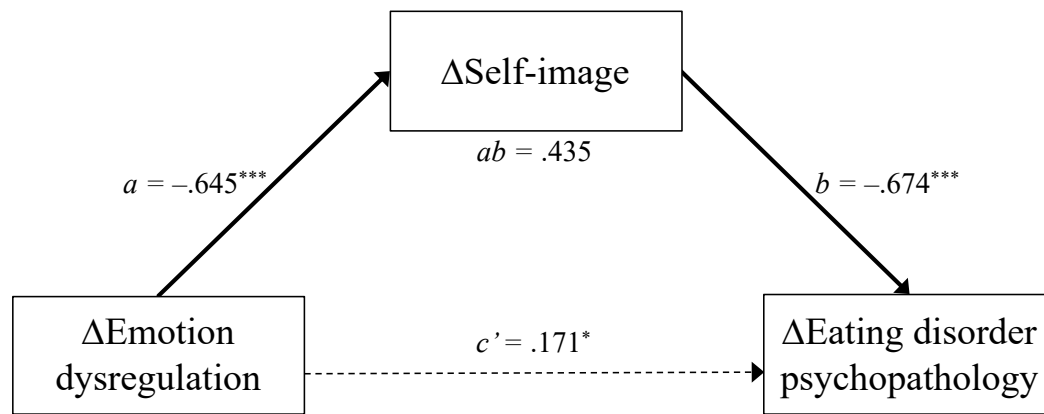


Figure 7. Indirect association between one-year changes in emotion dysregulation and ED psychopathology through one-year change in self-image; * $p < .05$, ** $p < .01$, *** $p < .001$.

Mediator inclusion in each model showed differentiating direct and indirect associations (Table 10). Inclusion of Δ SASB as mediator (pathway 1) diminished the association between Δ DERS and Δ EDE-Q considerably; there was only a trend significant direct association. Instead, there was an indirect between Δ DERS and Δ EDE-Q through Δ SASB. That is, less improvement/worsening in emotion dysregulation was indirectly associated with less improvement in ED psychopathology through less improvement/worsening in self-image (Figure 7).

Inclusion of Δ DERS as mediator (pathway 2) only slightly decreased the association between Δ SASB and Δ EDE-Q as there was still a significant direct association independent of Δ DERS, while the CI for the indirect association through emotion dysregulation included zero (Table 10). That is, less improvement/worsening in self-image was associated with less improvement/worsening in ED psychopathology regardless of change in emotion dysregulation.

5.4.4 Conclusions

Initial emotion dysregulation seemed at best an inconsistent, weak predictor of ED outcome in this sample of patients with a range of EDs receiving specialized ED TAU. However, change in emotion dysregulation showed clear associations with outcome where less improvement, or even worsening, was strongly associated with both higher follow-up ED psychopathology and remission status, even when initial severity was adjusted for. However, this was mainly an indirect association through less improvement in self-image, while less improvement in self-image was directly associated with less improvement in ED psychopathology regardless of change in emotion dysregulation.

6 DISCUSSION

This thesis examined self-rated trait-level emotion dysregulation in relation to clinical status, diagnostic presentation, specific ED symptoms, and ED outcome. It further explored the contribution of self-image to such associations by examining direct and indirect associations between emotion dysregulation, self-image, and both concurrent ED psychopathology and one-year outcome. An overall aim of the thesis has been to inform both risk models and potentially pathology-specific maintenance models. These broad aims were examined in four separate studies. Participants were patients with AN-R, AN-BP, BN, BED, and OSFED presenting to specialized Swedish ED treatment units and female university students as a comparison group.

6.1 MAIN FINDINGS

Study I found an association with clinical status, where patients with EDs generally reported higher emotion dysregulation than the comparison sample, and particularly higher difficulties in emotional awareness and clarity. There was little association with diagnostic presentation. Instead, emotion dysregulation seemed to be a primarily transdiagnostic trait. Emotion dysregulation did show distinct associations with ED symptoms, where higher perceived lack of emotion regulation strategies was uniquely associated with ED psychopathology in both patients and comparison participants. In patients, higher difficulties in impulse control and emotional non-acceptance showed unique associations with binge-eating, while lower difficulties in goal-directed behavior was associated with CE. **Study IV** found that initial emotion dysregulation was at best a weak predictor of ED outcome after specialized ED TAU in a subset of patients with available data. Change in emotion dysregulation was however clearly associated with outcome. Less improvement, or even worsening, in emotion dysregulation was strongly associated with both higher follow-up ED psychopathology and an increased risk of still having an ED after one year.

Studies II, III, and IV all demonstrated the central role of self-image in associations between emotion dysregulation and ED psychopathology. In both comparison participants and patients in **Studies II and III**, emotion dysregulation was strongly associated with negative self-image, and independently, both were associated with ED psychopathology. However, when examined concurrently, a clear pattern emerged in both studies where emotion dysregulation was only indirectly associated with ED psychopathology, through self-image. Self-image on the other hand had a strong association with ED psychopathology regardless of emotion dysregulation levels. More fine-grained analyses in **Study III** in patients with and without OBE, respectively, showed differentiating indirect effects through specific aspects of self-image. Lastly, **Study IV** showed that less emotion dysregulation improvement was only indirectly associated with less ED psychopathology improvement, through less self-image improvement. Again, less self-image improvement was directly associated with less ED psychopathology improvement regardless of change in emotion dysregulation.

6.2 EMOTION DYSREGULATION IN ED SYMPTOMS AND OUTCOME

This thesis offers an in-depth examination of self-rated emotion dysregulation in relation to ED pathology in the largest sample of participants with EDs in the literature to date. Results in all four studies yielded clinically relevant results suggesting that, when examined separately (i.e., analyses not including self-image), trait-level emotion dysregulation seems a primarily transdiagnostic characteristic of EDs, that potentially may represent both an ED risk factor as well as a maintenance factor with implications for outcome. These results are discussed below.

6.2.1 Emotion dysregulation as a transdiagnostic risk factor for ED symptoms

Emotion dysregulation distinguished participants with EDs from the comparison sample, but generally did not distinguish diagnoses from each other (**Study I**). Aspects of emotion dysregulation similar to alexithymia (i.e., poor emotional awareness and clarity) particularly and transdiagnostically differentiated participants with EDs from the comparison group, but not within EDs. This suggests that not only are such difficulties relevant in AN (Skårderud, 2007a), but seem relevant across EDs (e.g., Nowakowski, 2013). Difficulties in impulse control and goal-directed behavior when upset did not differentiate comparison participants from patients (except from BED regarding the prior). Similar results have also been reported by Wolz et al. (2015), suggesting that such aspects may not specifically indicate ED presence. It is however worth noting that differences between patients and comparison participants in this thesis were less pronounced, as the students reported somewhat higher and the patients somewhat lower dysregulation compared to patients and comparison groups in some previous studies (e.g., Brockmeyer et al., 2014 [German samples]; Harrison et al., 2010 [British samples]; Mallorquí-Bague et al., 2018 [Spanish samples]). Within EDs, difficulties in impulse control and goal-directed behavior when upset did not meaningfully differ between patients with AN-BP and BN compared to AN-R as might have been expected given the suggested influence of negative urgency in BN-pathology (e.g., Pearson et al., 2015). Thus, the only consistent finding in previous studies was not replicated (i.e., greater impulse control difficulties in AN-BP than AN-R). Using the cruder patient categorization in **Study III**, these difficulties only just differentiated participants with EDs including OBE from those without such symptoms. However, included participants with EDs had generally experienced symptoms for many years prior to presenting to initial assessments at treatment units. Therefore, potential impulsivity in relation to distress that may initially have impacted on symptoms could have progressed into more compulsive behavioral patterns, as suggested by Walsh (2013) and Pearson et al. (2015), then diminishing differences that may have differentiated patients closer to ED onset. Higher impulse control difficulties did however distinguish participants with BED from those with both AN subtypes and OSFED.

Overall, results here mainly strengthen previous findings reporting no diagnostic differences (Harrison et al., 2010; Pisetsky et al., 2017). Diagnostic differences that have appeared instead seem study-specific, possibly related to factors that varied between studies than actual ED diagnoses (e.g., recruitment procedures, different treatment levels, participants with comorbid psychiatric disorders excluded or not). Therefore, merely examining diagnostic differences in

self-rated emotion dysregulation does not seem to capture clinically meaningful and consistent patterns. However, other ways of grouping patients based on factors such as clinical severity and/or psychiatric comorbidity may do so.

6.2.2 The role of emotion dysregulation in ED psychopathology maintenance

Trait-level emotion dysregulation may represent a maintenance factor for ED psychopathology with implications for ED outcome. **Study I** demonstrated that perceived lack of emotion regulation strategies particularly seems influential in concurrent ED psychopathology, regardless of clinical status. This aspect of emotion dysregulation showed unique associations with ED psychopathology in both patients and the comparison group, corroborating findings by Pisetsky et al., (2017), and with presence of OBE in the comparison group. Rapid improvement in this aspect has also been associated with better outcome in BN (MacDonald et al., 2017). In **Study IV**, only overall emotion dysregulation change was associated with outcome in the subset of patients with available follow-up data. Even so, psychometric evaluations of the DERS have indicated that the Strategies subscale may primarily capture the overall emotion dysregulation concept (i.e., as captured by the Total score; Nordgren et al., 2020; Osborne et al., 2017). Thus, **Studies I** and **IV** results may both indicate the importance of feeling more confident in having strategies to manage distress in order to reduce ED psychopathology. Difficulties in emotional awareness and acceptance were additionally associated with ED psychopathology in patients in **Study I**, partly replicating previous findings in patients with AN (Racine & Wildes; 2013). Change in emotional awareness also showed a trend-significant association with follow-up ED psychopathology in **Study IV**, which remained when adjusting for initial clinical severity and anxiety. Larger samples may have clarified the relevance of this longitudinal association. Difficulties in emotional clarity and acceptance were additionally associated with ED psychopathology in the comparison group. Results therefore highlight that alexithymic traits and non-accepting attitudes to distress are highly relevant in relation to both clinical and sub-clinical ED psychopathology.

6.2.3 The unclear role of self-rated emotion dysregulation in behavioral symptoms

Self-rated emotion dysregulation may not be as relevant for behavioral symptoms. Explained variance for models in **Study I** including such symptoms was markedly smaller compared to ED psychopathology models, and associations were somewhat haphazard when compared to prior research. Similarly, explained variances in models examining associations between emotion dysregulation and ED remission (i.e., including behavioral symptoms under diagnostic cut-offs) in **Study IV** were lower than follow-up psychopathology models. In patients, higher difficulties in impulse control and in emotional acceptance showed unique associations with presence of OBE and SBE (**Study I**), respectively, the prior also seen in AN (Racine & Wildes, 2013). Further, *lower* difficulties in goal-directed behavior surprisingly showed a unique association with presence of CE, while no aspect was uniquely associated with purging. These findings are quite the opposite from those previously reported in BN (i.e., higher difficulties in goal-directed behavior associated with higher CE frequency and lower such difficulties with higher purging frequency; Lavender et al., 2014). Results were not more concordant in supple-

mentary analyses using behavioral symptom frequency. This may indicate that associations with behavioral symptoms should be examined within specific diagnostic groups (i.e., as done in Racine & Wildes, 2013 [AN], and Lavender et al., 2014 [BN]) rather than transdiagnostically (i.e., as done here in **Study I**). It might however indicate that associations between behavioral symptoms and emotion dysregulation are better captured by other approaches, for instance those involving momentary evidence of such associations (e.g., Lavender et al., 2017).

6.2.4 Improvement in emotion regulation as a mechanism of change

Study IV particularly highlighted the importance of change in overall emotion dysregulation in relation to outcome. Less improvement (or even worsening) in overall emotion dysregulation over one year was strongly associated with both higher follow-up ED psychopathology and with one-year remission status, independent of initial clinical severity and anxiety. In contrast, initial emotion dysregulation did not particularly inform about outcome. Higher overall initial emotion dysregulation was weakly associated with higher ED psychopathology, but not when initial clinical severity was taken into account. Initial emotion regulation showed no association with ED remission status. These findings largely corroborate previous findings (Accurso et al., 2016; Andersson et al., 2020; MacDonald et al., 2017); at best, initial emotion dysregulation may be a weak but inconsistent predictor of ED outcome. In contrast, emotion dysregulation as a potential mechanism of change influencing outcome is a finding seemingly consistent across diagnostic subgroup examined, in different treatment modalities, and different treatment lengths (e.g., Hazzard et al., 2020; Peterson et al., 2017; Rowsell et al., 2016).

However, there may be factors influencing the validity of at least some emotion dysregulation ratings. Although the majority improved in emotion regulation over the year in treatment, some participants actually reported higher dysregulation at follow-up. Most prior research suggests the improvement of emotion regulation with treatment, but there are reports of group level invariance (i.e., some individual worsening; Barney et al., 2019). Certainly, this might reflect actual worsening during treatment, but it may just as well reflect difficulties in accurately rating one's own emotion regulation abilities. Higher alexithymic traits and, as suggested by Bruch (1978; 1982), tendencies of misinterpreting emotions or confusing them with other interoceptive sensations (e.g., hunger, satiety, tiredness) may make ratings of emotion-related themes particularly challenging in EDs. Alternatively, due to behavioral symptoms having an emotion regulating or 'numbing' function (e.g., Engel et al., 2013; Espeset et al., 2012), some participants may not initially have experienced their emotion regulation as deficient. However, when prompted to reduce behavioral symptoms and retain regular eating, difficult and uncomfortable emotions might have (re)emerged, leaving some feeling more emotionally helpless at follow-up. Even so, the general pattern was that participants improved in both ED psychopathology and in emotion regulation, and that these changes were strongly associated.

6.2.5 Summary of emotion dysregulation in EDs

Taken together, these results add to previous findings suggesting that emotion dysregulation is a central transdiagnostic feature in EDs with potential implications for ED development,

maintenance, and outcome. Emotion dysregulation in general, and poor emotional awareness and clarity in particular, transdiagnostically differentiated participants with EDs from the comparison group, indicating these traits as potential risk factors. Emotion dysregulation generally did not differ between different ED diagnoses, although presence of OBE seemed to indicate slightly higher difficulties in impulse control and goal-directed behavior. In BED in particular, impulse control difficulties were elevated, and as noted, such difficulties were also influential in relation to presence of OBE, potentially as a maintenance factor. Perceived lack of emotion regulation strategies and difficulties in emotional awareness and acceptance were influential in relation to ED psychopathology, suggesting these aspects as transdiagnostic maintenance factors for cognitive symptoms. Overall emotion dysregulation improvement may also represent an important mechanism of change in relation to better outcomes. Studies with higher power may clarify if change in specific aspects (i.e., as indicated by trend-significant associations) could be of particular importance in relation to outcome.

6.3 SELF-IMAGE IN ED PSYCHOPATHOLOGY AND OUTCOME

Although not the main focus in this thesis, results in **Studies II, III, and IV** indicate that self-directed evaluations and behaviors (i.e., self-image) seem particularly intertwined with the ED, potentially regardless of levels of other traits (i.e., such as emotion dysregulation) thought to influence symptoms. These results, and prior results on self-image in samples partly overlapping the sample in this thesis (Forsén Mantilla et al., 2014, Forsén Mantilla, Norring et al., 2019; Forsén Mantilla & Birgegård, 2015), are discussed below.

6.3.1 The intertwinement of self-image and ED psychopathology

Negative self-image likely plays a central role in EDs as a potential risk factor as well as a maintenance factor. **Studies II and III** demonstrated marked associations between more negative self-image and higher ED psychopathology in both participants with EDs and comparison participants. As previously reported by Forsén Mantilla et al. (2014; 2015), these associations were descriptively stronger in patients than in comparison participants. Within EDs, they were slightly stronger in those without OBE (**Study III**). This indicates that although negative self-directed evaluations and behaviors are relevant in both sub-clinical and clinical ED-related thoughts, concerns, and preoccupations, they are increasingly intertwined with symptoms in fully developed EDs. Also, as seen in **Study III**, although those suffering from EDs including loss-of-control binge-eating generally reported slightly more negative forms of self-images than those with primarily restrictive EDs, symptoms seemed more intertwined with self-image in the latter group. The transdiagnostic theory of EDs highlight that in EDs, self-worth has come to depend on the control of eating, weight, and shape (Fairburn et al., 2003); such connections may be even more salient in restrictive EDs. These participants additionally rated slightly higher self-control than participants with OBE, highlighting the importance of strivings for control in restrictive ED pathology (Bruch, 1978, 1982; Godier & Park, 2014). Traits or tendencies such as low self-esteem, self-blame/criticism, negative perfectionism, and

striving for self-control may represent vulnerability factors for EDs (e.g., Fairburn et al., 2003). However, in fully developed EDs, such aspects are likely to be both elevated and increasingly overlapping with ED symptoms, then also serving as maintenance factors.

In contrast to potential challenges in self-rating emotion dysregulation, self-image as measured by the SASB (i.e., expressed as affectively toned self-directed behaviors) might instead be both more clearly experienced and easier to verbalize, and as such, easier to rate. Connections with ED psychopathology may also be clearly experienced. Self-image could for instance be subjectively experienced as the constant internal “self-talk” that both regulates behavior (“*Come on, keep running*”) and interprets future, present, and past events (“*Of course they stared at me as I’m so fat and ugly*”). The more negative self-image, the more malignant tone of such thoughts. Negative self-image may also approximate the experience of a controlling and critical ‘ED voice’ harshly demanding increased restraint, purging, or exercise in trying to manage self-worth but disregarding one’s actual needs (“*Don’t eat that, you’ll get enormous; get up, you cannot rest until you’ve burned it off*”; Aya et al., 2019). Even though coming from within, this voice may be experienced as actually coming from the ED as a separate entity, with the perceived negative control coming from the ED often resembling the negative control in one’s own self-directed behaviors (Forsén Mantilla, Clinton, et al., 2019).

6.3.2 Self-image seems central in ED outcome

Negative aspects of self-image are also implicated in ED outcome. More negative initial self-image aspects predict poorer one-year outcomes (Forsén Mantilla, Norring, et al., 2019). **Study IV** showed that over one year, participants generally moved from primarily negative self-images to positive ones, indicating that they were increasingly able to attend to themselves with protection, acceptance, and love, rather than with neglect, blame, and attack. These changes also seemed implicated in outcome, replicating previous findings in BN (Peterson et al., 2017). Specifically, less improvement (or even worsening) in self-image was associated with less improvement in ED psychopathology. Therefore, reducing negative control and other negative self-directed behaviors, whether or not experienced as coming from the ED or from oneself (Forsén Mantilla, Clinton, et al., 2019), and increasingly being able to attend to oneself with kind care and acceptance may improve outcome. Taking better care of oneself as a person and valuing oneself higher, will likely also facilitate taking better care of one’s physical needs and standing up for oneself in relation to the harsh demands associated with the ED.

6.4 THE INDIRECT ASSOCIATION BETWEEN EMOTION DYSREGULATION AND ED PSYCHOPATHOLOGY THROUGH SELF-IMAGE

Emotion dysregulation and self-image are interconnected traits both implicated in socio-emotional functioning, self-regulation, and ED pathology (e.g., Benjamin, 2018; Pennesi & Wade, 2016; Thompson, 2019). **Studies II, III, and IV** shows that emotion dysregulation and self-image both contribute unique information relation to ED psychopathology; self-image as

directly associated, and emotion dysregulation as indirectly associated with ED psychopathology, through self-image. This distinct association pathway, evident in both participants with or without OBE and in the comparison sample, suggests that self-image may be a potential mechanism whereby emotion dysregulation influences ED psychopathology regardless of clinical status or type. These findings are discussed below.

6.4.1 Emotion dysregulation ‘channeled through’ self-image may influence concurrent ED psychopathology

Higher overall emotion dysregulation was indirectly associated with higher ED psychopathology through more a more negative self-image in both comparison participants (**Study II**) and participants with EDs (**Study III**). This pathway suggests that experiencing emotions as vague, unclear, unwanted, unmanageable, and/or ‘out of control’ almost always goes hand in hand with more pathological levels of self-directed evaluations and behaviors, which in turn may increase efforts of dietary restraint and negative evaluations of one’s shape and weight, across levels of pathology (although with greater severity in developed EDs). This association pathway may describe how emotions are represented, interpreted, and concretized through self-reflection and regulation. As suggested above, subjective experiences of self-image as internal negative ‘self-talk’, may be more clearly experienced, and easier to verbalize and subjectively connect to the concrete and pressing ED symptoms. In contrast, themes related to emotionality may be experienced as distal and vague in relation to ED symptoms, and the association pathway indicates that emotional experiences may be “channeled through” self-image. That is, the nature of one’s self-image will have implications for how one understands, tolerates, and represents emotions, whether elicited by something from within (e.g., interoceptive signals, thoughts, memories) or from outside (e.g., interpersonal experiences, everyday challenges).

In relation to symptoms, emotions that are poorly integrated, confusing, frightening, and associated with self-destructive behaviors are likely most important. Qualitative work in EDs indicates that anger is often experienced as a difficult emotion to manage, and this is also true for sadness, fear, and disgust (Espeset et al., 2012). The association pathway could indicate that experiencing difficult and undesired anger induces self-directed attack and blame, which may then be translated into body-directed hate and blame. This likely also enables sufferers to mistreat, push, and punish the body as something more concrete, external, and “controllable”. However, these concrete actions may also contain some hope for change.

“I feel so bad (undifferentiated emotion), I’m bad. And disgusting (self-attack). And I look disgusting as well, fat and ugly. I don’t deserve to eat (concretized self-attack on the body through efforts of dietary restraint). ...but maybe, if I exercise enough, I could deserve food, and if I’m good enough, then perhaps someone will like me” (hope for change and love).

The association pathway may also suggest that processes related to emotion dysregulation constitute more basic vulnerability factors in EDs. Emotion dysregulation has a somewhat clearer biological, potentially innate, component than self-image (Linehan, 1993). In addition, an overall deteriorated physical health may exacerbate state-level emotional vulnerability

(Barret, 2018), and in EDs, symptoms such as restriction, binge-eating, and various potentially dangerous compensatory behaviors may all negatively impact on the physical health.

6.4.2 Pathology-specific associations

Emotion dysregulation may influence ED psychopathology through different self-image aspects depending on ED pathology type (i.e., with or without OBE). Within each group, similar self-image aspects were influential across emotion dysregulation dimensions.

6.4.2.1 Self-attack and (lack of) self-love in restrictive pathology

In primarily restrictive participants (i.e., without OBE), **Study III** showed that all emotion dysregulation dimensions, except perceived lack of emotion regulation strategies, were associated with higher ED psychopathology through less self-love. Self-love is above all intended to reflect secure attachment (Benjamin, 2018; Bowlby, 1988); the implicit knowledge of having someone (introjected or external important other) who can provide safety, love, and understanding when needed; for instance, when experiencing unwanted, unclear, intolerable, or ‘out of control’ emotions. In such situations, these patients may be more prone to believe that they will not be met with love. Here, engagement in ED preoccupations may therefore serve to cut them off, both from themselves but also from others, and in doing so, suppress painful hopes for love. Whether or not such implicit beliefs were present prior to ED onset, exaggerated by the ED, or even induced by the ED (Forsén Mantilla, Clinton, et al., 2019), they likely need to be addressed, not only for recovery but also for future functioning.

“What is this thing inside, I can’t stand it (poor emotional awareness and acceptance). Well, no one can help you with this, no one even wants you (lack of self-love). And just how much did I eat for lunch? I absolutely cannot eat any more today (efforts of dietary restraint). I’ll say that I’ve already eaten, I don’t want them to pry, they don’t get it anyway.”

Further, experiencing emotions as unwanted, unclear, intolerable, out of control, or hopeless to manage additionally implied increased self-attack (i.e., tendencies to harm, attack, and reject oneself), which is then subsequently associated with increased ED psychopathology. Self-attack intendeds to reflect introjected interactions in which one had to master perceived threats, either by attacking or to gain distance from them by aggressively recoiling (Benjamin, 2018). Perhaps in these patients, particular emotions may represent such threats, evoking intense self-hate concretized into aggressive attack towards the body through engagement in ED symptoms. This may be seen as efforts of protecting important others from one’s dangerous and uncontrollable emotionality.

“There is something bad in me, I just want to scream. God it’s pathetic (poor emotional clarity and acceptance). I hate, hate, hate it ...I hate me, I just want to disappear (self-attack). And I’m too fat, I take up too much space, I can’t have more food” (weight concern, dietary restraint).

Lastly, higher tendencies to see one’s emotions as intolerable, unacceptable, and embarrassing additionally implied higher self-control, then subsequently associated with increased ED

psychopathology. Here, ED pathology may be the means through which one attempts to keep one's emotions in check.

"I hate to cry, I'm so weak" (low emotional acceptance). Get yourself together, this is not who I want to be, I'm in control not my emotions (self-control). I also need to be healthier, lose some more weight, go out for a run" (weight concern, CE).

These findings add to existing models highlighting avoidant and alexithymic emotional processing style in restrictive ED pathology (e.g., the functional emotional avoidance model by Wildes & Marcus, 2011; the cognitive-interpersonal maintenance model by Treasure & Schmidt, 2013), by suggesting the contribution of low self-love and high self-attack, which may be more clearly experienced in relation to symptoms than emotional themes. Given the proposed prominence of self-control in restrictive EDs (e.g., Bruch, 1978, 1982; Godier & Park, 2014), it was somewhat surprising that there was only just an indirect effect through this aspect in the emotional non-acceptance model (and that this occurred in both groups). Other ways of grouping patients, such as taking factors such as compulsivity or impulsivity into consideration, or by contrasting highly restrictive patients with multi-impulsive patients, may have generated results with even higher specificity and clinical relevance.

6.4.2.2 Self-blame and (lack of) self-affirmation in loss-of-control binge-eating pathology

Participants with OBE displayed a more complex pattern. All emotion dysregulation dimensions implied less self-affirmation, that were subsequently associated with increased ED psychopathology. As such, in this patient group, increased emotion dysregulation implied perceptions of not being met by oneself (and possibly, by others) with friendly encouragement and acceptance. This likely has a negative impact on distress tolerance and reduces the possibility of feeling safe enough to take a step back to examine and disentangle emotionally laden situations. Instead, patients may turn to symptoms for distraction, as described by models highlighting symptoms functioning as an escape from aversive self-states (e.g., Heatherton & Baumaister, 1991) or as acts prompted by negative urgency (Pearson et al., 2015).

"Oh no, here it comes again, it feels so weird, I don't know what to do (poor emotional clarity, lack of strategies). I just don't get it, what's wrong now? I can't stand this, I can't stand being me (lack of self-affirmation). I have to get out of this! But I'm so very hungry, it smells so good, just one bit... no I can't... or can I?" (preoccupation with food and eating).

All emotion dysregulation dimensions further implied increased self-blame (i.e., accusing and devaluing oneself) subsequently associated with increased ED psychopathology. Higher difficulties in emotional acceptance additionally implied increased self-control and self-neglect (i.e., carelessness and indifference when considering oneself), and reduced self-love, all subsequently associated with increased ED psychopathology. Both self-blame and self-neglect are hostile in nature, but they differ in control. Self-blame includes efforts to control oneself whereas self-neglect instead implies letting go of control. Self-blame intends to reflect introjected interactions characterized by blaming and appeasing; self-neglect instead reflects

ignoring and walling off (Benjamin, 2018). Both patterns imply some anxiety-provoking underlying threat within the interaction (e.g., fear of abandonment), which may resolve by trying to approach (“*please, I’ll do anything*”) or depressively withdraw from it (“*you can go, I don’t need you anyway*”). If applied to emotionality, when experiencing unacceptable and threatening emotions, these patients may anxiously oscillate between harshly trying to control themselves and get themselves together or by giving up, to stop care all together. While self-blame and self-control may trigger increased efforts to control oneself through strict dietary rules and restraint, self-neglect may instead trigger giving up and giving in to loss-of-control symptoms like binge-eating. The latter is described in the ‘what-the-hell effect’ (Herman & Polivy, 1983), where small violations of (unrealistic) dietary rules can lead to overindulgence.

“Something is wrong, I know it. I must have done something, it feels so bad. Make it stop or I’ll go crazy (lack of strategies and impulse control difficulties when upset). Did I have to say that? How stupid can I be? Come on, get a grip of yourself, keep it together now (self-blame and self-control). Oh, what does it matter, I’m going down anyway (self-neglect). I’ll just take one sandwich... shit, I’ve ruined everything now... I might just as well go all the way, it’ll be one of those nights” (ED pathology, what-the-hell effect).

These findings add to existing emotion dysregulation models of binge-eating pathology (Fairburn et al., 2003; Wonderlich et al., 2015), by emphasizing the contribution of low self-affirmation, and the potential oscillation between self-blame and self-neglect as important links between difficult emotions and symptoms.

6.4.3 The importance of self-image improvement

Over time, **Study IV** showed that emotion regulation improvement was primarily associated with ED psychopathology improvement if an improvement in self-image also occurred, again highlighting the central role of self-image. Self-image improvement on the other hand was strongly associated with ED psychopathology improvement regardless of change in emotion dysregulation. For most participants, initial primarily negative self-images mainly changed into primarily positive ones at follow-up. Such a change suggests that, not only may participants increasingly take better care of themselves, but also that they may increasingly have (re)gained a more secure attachment (Benjamin, 2018; Mikulincer et al., 2019). This may additionally facilitate tending to one’s emotional needs: in being an internal *safe haven* for oneself, taking care of one’s individual emotional vulnerabilities (instead of punishing and judging oneself for them), and being an internal *secure base* from which one may increasingly approach dangerous, uncomfortable, and ‘out of control’ emotions (instead of escaping them through symptoms). As such, improved self-image over time may reduce the potential effect of emotion dysregulation on ED symptoms. Due to the scarcity of follow-up data, no fine-grained pathology-specific association pathways could be examined (**Study IV**). Thus, whether or not change in the potentially pathology-specific self-image aspects evident in **Study III** was differentially associated with outcome depending on initial pathology type remains unknown.

I don't know, I just started to actually think about what I wanted and needed in life and decided to take better care of myself (increased self-protection). Sometimes, I can even enjoy just being with myself (instance of self-love). That made it easier to stick to the meal plan (reducing ED symptoms) and stay put when I got anxious (despite negative feelings). But I think that in being kinder to myself, I felt that it wasn't so scary anymore when I felt bad like that, now I can just accept that sometimes my feelings go up and down. I mean, having negative feelings once in a while that doesn't mean I'm a weak and bad person (reducing effects of emotion dysregulation by better self-image, safe haven). Of course, it's still hard sometimes, but now I really feel that I'm sort of... there for me (secure base), and that makes it easier to get back on track.

Importantly, even though **Study IV** had two measurement points, causality was still unclear. In order to actually claim causality, one needs to demonstrate the temporal precedence of each process, thus necessitating several measurement points. Therefore, although the interpretations are plausible, they remain speculative. Additionally, emotion dysregulation and self-image are both proposed as mechanisms of change in relation to ED outcome, but as **Study IV** only had two points of measurement, such causality cannot be claimed with certainty. For instance, more stable eating habits and less potentially dangerous compensatory behaviors likely increases overall physical health which, in turn, may reduce overall negative emotionality in need of regulation (Barret, 2018). Similarly, reducing behavioral symptoms even though it is hard may induce a sense of mastery and pride, which is likely beneficial for self-image at least in the short term. However, both emotion regulation and self-image are traits developed long prior to EDs (Benjamin, 2018; Calkins et al., 2019), and even though the ED may exacerbate emotional symptoms and self-directed evaluations and behaviors, most sufferers likely had at least some such vulnerabilities prior to ED onset. Therefore, even though the hypothesized direction seems most plausible, there likely are some 'feedback loops' affecting the present state not accounted for in these analyses.

6.4.4 Summary of direct and indirect associations between emotion dysregulation, self-image, and ED psychopathology

Taken together, these results indicate that emotion dysregulation is of importance for ED psychopathology and outcome, but mainly when taking the influence of self-image into account. This suggests that experiencing emotions as unwanted, unclear, unmanageable, and 'out of control' is strongly associated with more pathological self-directed evaluations and behaviors, in turn associated with more efforts of dietary restraint and negative evaluations of one's shape and weight. This association pathway being present in different pathology levels (i.e., in both patients and comparison participants) suggests that it may potentially describe both clinical and sub-clinical symptom maintenance. That is, results did not suggest different processes depending on clinical status, but merely indicated that the strength and severity of the process may be higher in clinical groups. However, if process in the comparison sample would have been examined through more fine-grained analyses (i.e., as in **Study III**), relevant differences related to clinical status might have emerged. These analyses did indicate pathology-specific pathways whereby emotion dysregulation dimensions seemed to influence

ED psychopathology through specific self-image aspects. Lastly, improvement in emotion regulation was primarily associated with ED improvement if improvement in self-image also occurred, highlighting again the central role of self-image. Importantly, all direct and indirect associations between emotion dysregulation and ED pathology examined in the clinical sample only modelled global ED psychopathology as outcome. Therefore, indirect effects on specific and differentiated outcomes are only speculations. **Study II** did examine pathways in relation to OBE, SBE, and CE (with evidence of indirect effects in relation to binge-eating). However, as evident in **Study I**, associations between emotion dysregulation and behavioral symptoms may not be adequately captured using the DERS. Also, the statistical complexity of **Study III**, and the low power in **Study IV**, did not permit additional examinations in relation to more fine-grained ED outcomes.

6.5 DEVELOPMENTAL CONSIDERATIONS

Whether or not the association pathway through which emotion dysregulation is indirectly associated with ED psychopathology via self-image actually stems from early interpersonal relationships and as such, reflects developmental trajectories, is not answered in this thesis. That is, it cannot say whether those suffering from EDs had early interpersonal interactions characterized by neglect, attack, blame, or emotional invalidation, which then negatively influenced the emerging sense of self and emotion regulation abilities, in turn increasing future risk of ED symptom development and maintenance. Psychological development is also complicated by the fact that similar interpersonal experiences may have differential effects for different individuals depending on underlying heritable vulnerabilities. Although the effects of such vulnerabilities are channeled through relational experiences (i.e., how important others respond to such traits, or how such traits moderate own responses to significant others), they may also be influenced by observational learning (Thompson, 2019). That is, children observing parents managing their own potential vulnerabilities, in turn influencing how children will appraise and manage similar traits in themselves, and later on, observations and influences through peers, partners, other influential persons, as well as cultural ideals and messages (c.f., Haynos & Fruzzetti, 2011). As such, this thesis cannot say anything about the origins of the measured traits as there are too many potentially influential factors.

The results of this thesis do however indicate that emotion dysregulation and negatively attuned self-directed evaluations and behaviors are associated with both higher current and subsequent ED symptom load. Whether or not such traits were present prior to ED onset, or exaggerated and/or induced by the ED (Forsén Mantilla, Clinton, et al., 2019), they likely need to be addressed in treatment, not only for recovery but also future functioning. As such, increasingly being a better symbolic “parent” to oneself in the present (regardless of the quality of one’s actual early attachment relationships, genetic vulnerability, negative cultural or social influences etc.) may facilitate ED recovery through increased and beneficial attention to one’s psychological, emotional, and physical needs. In a wider sense, being able to accept and take better care of potentially more longstanding emotion-related vulnerabilities by responding

more compassionately and non-judgmentally to oneself likely entails less severe consequences of such vulnerabilities. Such a stance may therefore be of importance in order to improve overall mental health and long-term outcomes.

6.6 CLINICAL IMPLICATIONS

Results from this thesis indicate that emotion dysregulation and self-image are implicated in ED maintenance and outcome, and potentially also in ED etiology. In particular, although results confirm considerable associations between emotion dysregulation and ED psychopathology that would benefit from clinical attention, they particularly highlight the importance of addressing self-image when doing so. Self-image was central in both concurrent (**Studies II and III**) and follow-up ED pathology (**Study IV**) regardless of emotion dysregulation. Therefore, the results suggest that helping patients to respond to themselves with acceptance and protection rather than harsh blame and neglect, even in the presence of unwanted, undifferentiated, and ‘unmanageable’ emotional arousal, may provide patients with necessary tools for reducing ED symptoms. Ways of improving self-image and responding more compassionately towards oneself have been popularized through compassion-focused interventions (Gale et al., 2014), although a stance where the therapist works to improve self-image can be employed into many forms of treatment.

6.6.1 Explore emotions underlying symptoms through kinder self-directed behaviors

Self-directed evaluations and behaviors may be more clearly experienced in relation to symptoms, and therefore interventions targeting emotion regulation may be more efficient if they are delivered with clear connections to self-image. That is, therapists could first explore self-directed thoughts that may have preceded negative body-related perceptions or increased dietary restraint. Once self-image and its potential impact on pathology has been understood, it may be easier to explore if some confusing, frightening, or unmanageable emotional experience underlies this association. From there, it may be possible to examine underlying emotional experiences and if the self-directed attack and subsequent ED symptoms may be a way of avoiding directly experiencing and expressing negative emotions such as anger.

“I remember thinking that I’m such a worthless and insignificant person compared to everybody else (self-attack, self-blame), but then I skipped a meal which made me feel a little bit better (dietary restraint). Before that? Hmm... this morning I did find out that my friends had been hanging out last night without asking me, perhaps that could have made me a bit angry? But I never get angry... I just felt... bad. I guess” (poor emotional awareness, clarity, and acceptance).

However, as indicated in **Study I**, merely acknowledging and differentiating emotions may be problematic in this population. Here, therapists modelling behaviors associated with positive self-image (i.e., showing interest, acceptance, and validation) and staying put when emotions arise, may help patients to develop similar traits. Research also indicates that having many

words for different emotions could underly greater success and flexibility in managing emotions (Barrett et al., 2001; Smidt & Suvak, 2015). Therefore, by creating a safer internal climate, patients may dare to approach, experience, and label a wider range of emotional experiences, which may then make emotions easier to both tolerate and manage in more emotion-specific and situation appropriate ways.

“I just can’t stand this awful ... state, in me, I just feel so bad! [Can you try letting it be there, just for a bit here with me, and focus on where you feel it in your body?] (showing kind interest and curiosity) ...I can try... [I know that it is hard, but I’m with you]” (validating feeling, being there). Oh, this is not nice, it’s a bad feeling ... [what does “bad” consist of?] I think I’m angry, but I also feel like crying [perhaps you’re also a bit sad?] (helping with emotional clarity). Yeah, I think so too, for being so alone.

6.6.2 Increase emotion regulation skills through acts of self-compassion

Research further suggests that successful emotion regulation requires actual skills, but also beliefs that emotions can be modulated and that one has the skills to do so (Gutentag et al., 2017; Kneeland et al., 2016). That is, the opposite of the emotional helplessness, lack of strategies, and tendency to surrender to negative emotions that was particularly associated with ED psychopathology in **Study I**. Providing patients with alternative skills to regulate emotions may not be enough; one has to believe that emotions can change and/or be managed, coupled with increased confidence that one could do so without resorting to harsh self-regulation, possibly through ED symptoms. Gradually introducing alternative strategies that can be employed in a more self-compassionate way, could increase both emotion regulation repertoire and confidence, over time reducing the need for ED symptoms.

“But what am I supposed to do when I feel bad at home? I mean, that makes me hate myself so much, which only gets worse if I end up bingeing – then I hate myself even more and make myself purge all night as punishment for being so weak... [Could we think of a way to insert a pause somewhere in this chain? Where you do something nice for yourself instead of beating yourself up?] (emotion regulation in a self-compassionate way). I don’t know... like what? [How about listening to music you like, watching something fun, or saying to yourself what you would have said to a friend that felt bad] ...perhaps watching funny cats on Youtube would help, I could try that” (gradually increasing more self-compassionate regulation strategies).

However, some patients may be fearful of and feel uncomfortable by receiving compassion from both self and others (Kelly et al., 2013), making self-image transformation challenging. A more gradual move in self-image transformation may therefore feel more tolerable.

“Yuck, being angry is just so pathetic, I’m pathetic. I can’t stand myself, stop eating is all I can do. [Could we see if you can let yourself be, just the way you feel right now?] But I don’t want to be angry, what’s wrong with me? Really, what’s wrong with me!?” (self-curiosity expressed as harsh self-blame) [How about asking yourself exactly this question again, but like you do

want to know? Perhaps then we can see what the anger is really about] Okay, I could try that...” (validating self-curiosity, reducing negative valence in self-directed behavior).

Results in **Study III** indicated that in patients with restrictive EDs, problems regulating emotions may particularly be translated into self-attack and lack of self-love. Interpersonally, this suggests insecure attachment (Benjamin, 2018), which is why particular focus on patients’ sense of security within therapy may be essential when exploring emotional themes that potentially underlie instances of self-attack. **Study I** indicated that difficulties with anxiety-driven impulsivity and distress tolerance could be implicated in binge-eating. Relatedly, being able to temporarily tolerate distress might rely on knowing that one can exercise or purge later, making such difficulties relevant also in relation to these symptoms. **Study III** highlighted that for patients displaying loss-of-control binge-eating, increasing curiosity and acceptance towards their own mental states (i.e., increase self-affirmation), while neither trying to increase negative control nor giving up (i.e., reducing self-blame and -neglect), might be particularly important when trying to reduce the impact of emotion dysregulation on symptoms.

6.6.3 Improve outcome through emotion regulation and self-image improvement

Just over one half of patients in **Study IV** were in remission at one-year follow-up. Even so, there is room for improvement. Overall, reductions in self-rated ED psychopathology were larger than reductions in emotion dysregulation and negative aspects of self-image. Patients in this study received TAU, and while some may have had treatment targeting aspects of self-image and emotion dysregulation, this was unlikely to be normative. Treatment specifically and more systematically targeting self-image, and its implications for emotion regulation as well as ED symptomatology, may through greater self-image and emotion regulation improvement also increase remission rates. This is not to say that standard ED interventions aimed at restoring and stabilizing normal eating patterns should be abandoned or substantially reduced, but the success of symptom-focused interventions may be influenced by these self- and emotion-related processes. An increased focus on psychological processes, often subjectively perceived as influential in ED development and maintenance, is also often emphasized and requested by patients (Bezance & Holliday, 2013). Additionally, there is a considerable number who have formally recovered from EDs but still suffer from residual ED symptoms, various types of comorbid psychopathology, lower overall quality of life, lower social functioning, and lower psychological well-being (Tomba et al., 2019). Emotion dysregulation and self-image related processes are relevant for other life areas such as increased positive and reduced negative affect (Berking et al., 2008), greater well-being, socio-economic status, and income (Côté et al., 2010), and overall better mental health (Mann et al., 2004). Additionally, being able to attend more compassionately and non-judgmentally to underlying psychological and emotional vulnerabilities, and taking better care of one’s psychological needs, may entail less severe consequences of such vulnerabilities. Therefore, targeting problematic traits such as emotion dysregulation and self-image may also improve overall mental health, reduce psychological vulnerability, and reduce the risk of ED relapse, although this remains to be examined.

6.6.4 Interpersonal implications in treatment

As EDs often entail various interpersonal difficulties such as conflicts, power struggles, and social withdrawal, helping patients to understand how relationships inside and outside therapy impact on symptoms may be beneficial. When doing so, it is of importance that therapists create a climate where interpersonal themes can be openly discussed, as well as being mindful of their own reactions towards patients (in order not to maintain problematic regulation processes). Having a primarily negative self-image is assumed to increase the risk of interpreting interpersonal interactions as having hostile undercurrents (Benjamin, 2018). For instance, while the therapist may display friendly listening, a patient may interpret the silence as passive neglect. Such interpretations may increase the risk of the patient interpersonally distancing and potentially reinforce self-neglect (*“no one cares about me, so why should I?”*). Similarly, while the therapist may regard interventions aiming for renutrition as doing something good by actively taking care of the patient’s needs (i.e., positive protection), the patient may experience this as intrusive and negative control which he or she reacts to defensively. In this way, patients and therapists could get stuck in negative struggles for control. Other patients may experience various interventions as criticism, which may further reinforce their own self-blame (*“I’m never good enough, I cannot even stop blaming myself. I let everybody down, including my therapist”*). Openness within therapy, knowledge about self-directed behaviors and interpersonal patterns, and supervision may help therapists navigate such potentially problematic interactions with patients.

6.6.5 Emotion regulation and self-image in ED prevention

Improving emotion regulation and self-image could also be relevant in ED prevention. Although comparison participants were beyond the typical age of ED onset (Smink et al., 2012), findings in **Study I** particularly suggested focussing emotional awareness, clarity, and acceptance as ways of preventing EDs. **Study I** also suggested that increasing flexible usage of adaptive emotion regulation strategies may hinder individuals from (increasingly) relying on ED symptoms for such purposes. **Study II** additionally highlighted that both ED prevention and treatment of subclinical ED symptoms may benefit from promoting more self-compassionate ways of attending to one’s emotional, psychological, and physical needs.

6.7 STRENGTHS AND LIMITATIONS

A main strength in this thesis is the large, nationally representative clinical sample in **Studies II and III**. Being drawn from an established national clinical database covering the majority of patients seeking Swedish specialized ED-treatment, ecological validity and generalizability to similar populations are high. The large sample size, including a wide range of DSM-5 diagnostic subgroups, also made it possible to primarily consider significant effects with moderate-large effect sizes, and in doing so, reduce the risk of overemphasizing spurious findings. Having a comparison group (**Studies I and II**) enabled differentiation between

clinical and non-clinical variation, but also identification of potentially similar maintenance processes regardless of clinical status. Further, **Studies II, III, and IV** concurrently examined both emotional and self-related factors previously shown to be meaningful in EDs. The fine-grained analyses of these factors in the two clinically relevant sub-samples in **Study III** allowed high specificity, and the examination of their interaction in relation ED outcome in **Study IV** clarified their roles as proposed mechanisms. Lastly, the thesis used data from well-established and clinically relevant instruments (i.e., the DERS, EDE-Q, and SASB) that have all been used in previous research in ED populations. However, several limitations need consideration.

6.7.1 Conceptual limitations

All included studies relied on self-ratings (although ED symptoms underlying the diagnoses were assessed by clinicians at both initial registration and one-year follow-up). This limitation is particularly related to the generalizability of self-rated trait-level emotion dysregulation; it raises the question of whether self-ratings capture meaningful real-life patterns, whether self-ratings are accurate representations of actual abilities, if alexithymic traits may obstruct ratings, and if self-ratings would correspond to ratings done by others. There is evidence of meaningful correspondence between higher emotion dysregulation (measured by the DERS) and several momentary emotion regulation related instances in student populations (e.g., higher negative affect, more attempts of regulation, higher usage of avoidant strategies, lower emotional differentiation; Daros et al., 2020). However, similar examinations in participants with EDs are needed to strengthen the external validity of DERS in such populations. Relatedly, the DERS only measures dysregulation of negative emotions, even though dysregulation of positive emotions may also be relevant in EDs (Coniglio et al., 2019).

Further, the present thesis is the first to examine the interrelations between emotion dysregulation measured by the DERS, self-image using SASB, and ED psychopathology, which highlights the need for caution in relation to both interpretations and implications of the results. Although the main model was replicated in three samples (comparison group in **Study II**, two clinical groups in **Study III**), indicating some stability in the findings, further replication is needed, as well as examination of potentially confounding factors, other mediators, and/or moderators. This is particularly true for the model using change variables over one year (**Study IV**). Here, more fine-grained analyses including multiple mediators and patients with different clinical profiles (e.g., as in **Study III**) would improve specificity. Models also taking different treatment modalities into account may clarify potential confounders, and analyses additionally examining associations between emotion dysregulation, self-image, and comorbid psychiatric symptoms would better reflect the overall clinical profiles in EDs. Importantly, as there were only cross-sectional data in **Studies II and III**, causality cannot be inferred. Even though the presence of statistical mediation may strengthen the theoretical possibility of a specific, causal association pathway, other methodological designs using additional data points are needed to make such claims. Not even two time-points (as in **Study IV**) is sufficient; additional time-points that temporally precede each other are needed for association chains of direct and indirect effects to be anything other than speculative.

6.7.2 Methodological limitations

The DERS was translated from English to Swedish for the present thesis and has therefore not yet been extensively used and examined in Sweden. Two studies in adult and adolescent patients with EDs from the Stepwise database (i.e., partly overlapping samples in this thesis) examining the psychometric properties of the Swedish DERS indicated adequate validity and reliability (Monell et al., 2021; Nordgren et al., 2020). However, participants with EDs in this thesis generally reported less emotion dysregulation than in previous studies and the comparison group slightly more, which may potentially be related to characteristics of the Swedish DERS translation. It might however also reflect cultural differences, selection biases, or other unknown factors.

The emotion dysregulation dimensions used in **Study III** have not been psychometrically examined and validated in EDs. When these four factors were examined within a lower-order correlated traits model, bad fit was indicated in university students (Lee et al., 2016), but models showing good fit in non-clinical samples often do not fit as well in clinical samples (Nordgren et al., 2020; Osborne et al., 2017). Presently, there has been no examination of this solution in clinical samples, or alternative examinations using second-order or bifactor four-factor solutions. However, Awareness and Clarity both capture considerable unique information beyond a general emotion dysregulation factor in contrast to other DERS subscales (using bifactor modelling; Nordgren et al., 2020; Osborne et al., 2017). They correlate strongly, and primarily with each other, in both pathology groups (Non-OBE: $r=.541$; OBE: $r=.556$; $ps<.001$), and these subscales also have been combined in previous work (Cho & Hong, 2013; Preece et al., 2017). Relatedly, Goals and Impulse both capture only minor degrees of unique information (Nordgren et al., 2020; Osborne et al., 2017) and show strong intercorrelations (Non-OBE: $r=.637$; OBE: $r=.658$; $ps<.001$). Thus, although not psychometrically examined, the combination of Awareness/Clarity and Goals/Impulse is, apart from being theoretically relevant, at least empirically reasonable.

The patient categorization in **Study III** is not commonly accepted, and only OBE but not purging was considered when participants were categorized. There are however some prior findings that particularly point to relevant differences in impulsivity and various ED features depending on presence or absence of binge-eating in EDs (Fernandez-Aranda et al., 2008; Gleaves et al., 2004), as well as stronger unique associations between negative urgency and binge-eating as opposed to those with purging in female students (Peterson et al., 2012). In **Study III**, there were also some relevant differences in emotion- and self-related variables between the groups, and the mediation model results were slightly different between the groups. This provides some validity to this kind of patient categorization although there is reason to examine the potential impact of both binge-eating and purging further.

A major limitation of this thesis relates to sample representativeness and generalizability. The main source of this limitation is the lack of control over DERS administration to patients. In relation to the total amount of potential patients during the thesis time frame, lack of DERS ratings was a considerable source of attrition, threatening sample representativeness in **Studies**

I, III, and IV. For **Study IV**, attrition was also due to the overall low rate of follow-up assessments, and analyses including change scores induced yet another source of attrition due to the DERS being optional, not only at initial registration, but also at follow-up. The DERS was administered to patients on an individual basis and there was no information on why clinicians chose to include the DERS or not. A pattern was observed that the most common way of handling optional measures in Stepwise was to either chose no optional measures, or to choose several. This suggests that measures may not be chosen based on patient characteristics, but instead based on if clinicians and/or units have interest in additional traits or not. Even so, there may still be systematic variation that could affect the representativeness, generalizability, and validity of the results, although extensive attrition and drop-out analyses revealed very few potentially relevant differences between patients with or without DERS ratings. Some of those differences are however worth mentioning.

In the **Study I and III** sample, participants with BN and DERS ratings had slightly lower presence of self-rated OBE, meaning results may be somewhat influenced by features of those patients with BN who perhaps do not want to endorse this symptom. Regarding generalizability for the **Study IV** sample, among all of those with complete follow-up assessments (and information on treatment), those also having initial DERS ratings had more often received psychotherapy during the year in treatment. Further, among all of those who had received psychotherapy (regardless of initial DERS status), those with initial DERS had more often received at least some CBT compared to patients without initial DERS. This pattern is likely more attributable to therapist-related factors rather than patient-related factors, with psychotherapists (particularly CBT-oriented ones) potentially being more interested in assessing additional traits. This may not however have impacted much on results as there were no substantive differences in remission rates or follow-up study variables between those groups. Lastly, results from analyses with change scores seem to be overall representative, except that participants with AN-R included in these analyses reported lower levels of initial DERS non-acceptance, DERS strategies, and anxiety, indicating that this subset of patients may have somewhat less emotion-related difficulties than those not included. However, this group only represented 14% of the change analyses sample, making this unlikely to have had meaningful effects on overall results. If anything, this would mainly have decreased the strengths of the associations due to floor effects. Apart from the above caveats regarding generalizability, results may not generalize to other ED populations, such as males (**Studies I and III**), more culturally diverse groups, and non-treatment seeking individuals with EDs.

There is also some concern about whether self-selected university students are suitable as a comparison sample, and about their representativeness. No information was available on characteristics of students who declined to participate and there is a possibility that those who participated in some way systematically differed from those who chose not to. Similarly, no attrition analyses could be performed for participants dropping out (i.e., did not return questionnaires). Relatedly, whether or not university students in general are suitable as comparison groups is unclear. There were no overall differences in age and BMI between the two samples, but other potentially meaningful demographic variables (e.g., socio-economic

status, occupational status) might differ between samples. More than half of all women in a similar age span as the majority of the participants with EDs are enrolled in university studies in Sweden (Sadurskis, 2017), so such students seem at least reasonable as a comparison group in Swedish contexts. Even so, socio-economic status is likely associated with higher education, and socio-economic status may possibly be inversely associated with some EDs. Having an ED may also negatively affect opportunities for higher education. As such, more optimally matched comparison participants could have benefited this thesis. Additionally, even though **Studies I** (the second part) and **II** required variation in the ED variables in the comparison sample (i.e., some severity was needed for meaningful patterns of associations), differences between ED and comparison participants (first part of **Study I**) may have been clearer if comparison participants with (sub-)clinical levels of pathology would have been excluded.

6.7.3 Statistical limitations

Internal consistency for initial ratings of the EDE-Q subscale Eating Concern was questionable in both clinical samples (**Studies I/III** and **IV**). Therefore, in **Study I**, results regarding this subscale should be interpreted with caution. The other EDE-Q subscales had fair to good levels of internal consistency and as such, results from **Studies I** and **III** including the Global Score likely are reliable. In **Study IV**, Eating Concern items only contributed to change score analyses, and as all EDE-Q subscales had good to excellent internal consistency at follow-up, the EDE-Q change scores were most likely overall consistent and results reliable. For SASB, internal consistency was poor for self-emancipation (Cluster 1) in the clinical sample which is why this cluster was removed from the extended models, while self-control (Cluster 5) remained in analyses even though its internal consistency was questionable. Therefore, results including this cluster need to be interpreted with caution. As these clusters are not included in the Affiliation score, results for the simple mediation models are unaffected (fair to good internal consistency for included clusters). Internal consistency for self-neglect (Cluster 8) was questionable in the comparison group, and in initial ratings in the **Study IV** sample. However, in these studies, only Affiliation scores were used (in **Study IV**, initial and follow-up Affiliation scores in change analyses), and as internal consistency was fair-excellent for all other Affiliation clusters, the Affiliation score in **Study II** and SASB change scores in **Study IV** were most likely overall consistent and results reliable.

In all studies, there were a large number of analyses, leading to an increased risk for Type-I errors. The lowered *p*-levels in **Studies I, III**, and **IV**, and utilizing 99% CI:s in mediation models in **Studies III** and **IV** hopefully countered such errors, although there may still be some false positive findings. However, the 99% CI:s in the **Study III** extended mediation analyses, in combination with inclusion of seven more or less correlated mediators in each model, likely contributed to the observed indirect effects being relatively few and rather weak. In **Study IV**, the small sample size (particularly in change score analyses) reduced power for associations between specific subscales and ED symptoms. It also prevented sub-group analyses and more fine-grained mediation analyses, for instance by using prominent clusters from **Study III**.

Lastly, there are some differences in the statistical methods between studies worth mentioning. In **Study I**, additional analyses in the clinical sample were adjusted for depression, while in **Study IV**, they were adjusted for anxiety. Depression and anxiety are both derived from the CPRS (with some item overlap) and are strongly correlated. Therefore, they most likely capture very similar variation. Other covariates also differed between studies. In **Study I**, associations were adjusted for BMI and ED duration in the clinical sample, while mediation models in **Study III** were adjusted for BMI and age, with age and ED duration being strongly correlated. In **Study III**, mediation models were unadjusted. Similarly, in comparison participants, analyses in **Study I** were adjusted for BMI and age, while mediation models in **Study II** were unadjusted. It would have been preferable to consistently adjust for the same variables consistently. In **Study II**, all analyses were exploratory and therefore, no adjustment was considered as most relevant, while in **Study IV**, low power was the reason for not adjusting the mediation models. Men were also included in this study in order to maximize the sample size, but it is possible that a sufficiently large all-male sample would have yielded different results. However, males were only 5% of the entire sample and may therefore not have affected results to any considerable extent.

7 CONCLUSIONS

This thesis has offered an in-depth examination of self-rated multidimensional emotion dysregulation in relation to ED symptoms in terms of clinical status, diagnostic presentation, specific ED symptoms, and one-year ED outcome. It further examined associations between self-image and ED psychopathology, as well as explored the contribution of self-image in associations between emotion dysregulation and ED psychopathology. The overall aim of the thesis has been to inform both risk and potentially pathology-specific ED maintenance models, and to suggest clinical implications based on such findings.

Studies I and **IV** particularly suggest that emotion dysregulation is a central transdiagnostic feature in EDs with potential implications for ED development, maintenance, and outcome. Higher overall emotion dysregulation, and poor emotional awareness and clarity in particular, transdiagnostically differentiated participants with EDs from the comparison group in **Study I**, which suggests these traits as potential ED risk factors. Overall, emotion dysregulation generally did not differ in any meaningful way between different ED diagnoses, except that in participants with BED, impulse control difficulties when upset were elevated compared to those with AN and OSFED. In BED, the most prominent symptom is frequent loss-of-control binge-eating, and this symptom was particularly associated with impulse control difficulties, indicating this aspect of emotion dysregulation as a potential maintenance mechanism for binge-eating. **Study I** also showed that perceived lack of emotion regulation strategies and difficulties in emotional awareness and acceptance were influential in relation to ED psychopathology, which suggests that these aspects may be transdiagnostically implicated in the maintenance of cognitive symptoms. **Study IV** further indicated that while initial emotion dysregulation did not particularly inform on likely outcome, whether or not there is considerable improvement in emotion regulation abilities seems to do so. Specifically, less improvement (or even worsening) in overall emotion dysregulation over one year was strongly associated with both higher follow-up ED psychopathology and with remission status, this being independent of initial clinical severity and anxiety. Thus, improvement in emotion regulation may be an important mechanism of change in relation to better ED outcomes.

Negative self-image likely also plays a central role in EDs as a potential maintenance factor. **Studies II** and **III** demonstrated marked associations between more negative self-image and higher ED psychopathology in both participants with EDs and the comparison group. **Study IV** further showed that negative aspects of self-image also seem implicated in ED outcome. Similar to change in emotion dysregulation, less improvement (or even worsening) in self-image was associated with less improvement in ED psychopathology.

When emotion dysregulation and self-image were examined concurrently in relation to ED psychopathology in **Studies II, III, and IV**, results indicate that emotion dysregulation is of importance for ED psychopathology and outcome, but mainly when taking the influence of self-image into account. Results in mediation analyses unambiguously showed that self-image was directly associated with ED psychopathology regardless of emotion dysregulation levels;

emotion dysregulation was only indirectly associated with ED psychopathology, through self-image. This clear association pathway suggests that self-image may be a potential mechanism whereby emotion dysregulation influences ED psychopathology. That is, experiencing emotions as unwanted, unclear, unmanageable, and ‘out of control’ may go hand in hand with worse self-directed evaluations and behaviors, in turn associated with more efforts of dietary restraint and worse evaluations of one’s shape and weight. This association pathway was present in different pathology levels (i.e., in both clinical and comparison participants), which suggests that it may describe both clinical and sub-clinical symptom maintenance. Fine-grained analyses in **Study III** indicated that self-attack and lack of self-love may particularly influence symptoms in patients with primarily restrictive ED pathology, while self-blame and lack of self-affirmation were influential in patients with loss-of-control binge-eating. Lastly, **Study IV** showed that emotion regulation improvement was primarily associated with ED improvement if an improvement in self-image also occurred, again highlighting the central role of self-image.

Taken together, although results confirm considerable associations between emotion dysregulation and ED psychopathology that would benefit from clinical attention, they particularly highlight the importance of addressing self-image when doing so, regardless of when patients started having difficulties with emotion regulation or treating themselves badly. That is, helping patients to respond to themselves with acceptance and protection rather than harsh blame and neglect, even in the presence of unwanted, undifferentiated, and ‘unmanageable’ emotions, may provide them with necessary tools for reducing ED symptoms.

8 POINTS OF PERSPECTIVE

This thesis presented an in-depth and nuanced examination of associations between emotion dysregulation, self-image, and both present and follow-up ED psychopathology. Even so, there is still much to be learned about these concepts in EDs along with several directions for future research. As mentioned, this thesis mainly relied on self-rated pathology, and although such measures can capture subjectively valid perceptions and experiences, they may be biased in several ways (Althubaiti, 2016). There may also be discrepancy between inner experiences and outward expression, with ensuing implications for interpersonal interactions, that would be interesting to explore. Future research would therefore benefit from mixed method approaches in order to capture these concepts from different angles. Qualitative research may enrich findings and approaches such as ecological momentary assessments could help to clarify if the suggested association pathway (i.e., emotion dysregulation influencing ED psychopathology through self-image) describes momentary, subjective experiences or if it rather describes traits (i.e., emotion dysregulation) that engender the expression of other traits (i.e., negative self-image) in relation to ED psychopathology.

Larger samples in future research examining longitudinal associations between these concepts could produce more nuanced results, such as if change in specific emotion dysregulation aspects, as well as specific self-image aspects, are more influential in relation to outcome than others. Relatedly, examination of potential factors moderating these associations would be interesting to explore, that is, if change is more or less important depending on patient characteristics (e.g., clinical severity, psychiatric comorbidity, compulsivity, impulsivity). The contribution of different treatment modalities, techniques, and clinician characteristics would be also interesting to explore. Such factors may also be examined as potential confounders in obtained results. Most importantly, future research would need additional time-points that temporally precede each other in order to allow for causal interpretations of association chains of direct and indirect effects between emotion dysregulation, self-image, and ED psychopathology. More data points would also allow taking “feed-back loops” (i.e., ED psychopathology also influencing emotion dysregulation and self-image, respectively) into account. Future studies may also examine such associations in relation to comorbid psychiatric symptoms to better reflect the overall clinical profiles in EDs, as well in relation to both long-term ED and comorbid pathology, potential relapse, and general psychological well-being.

Lastly, in order to actually make more certain claims regarding if emotion dysregulation and self-image represent risk factors for EDs, data prior to ED onset are needed. However, as mentioned, such data is problematic to collect, and therefore, more optimally matched comparison groups along with examinations after recovery could be an option.

Results in this thesis have relevance for clinical practice. However, as the results only reflect a subset of factors that might impact EDs, there is a risk that the potential impact of the results gets overestimated at the expense of other factors not examined. Also, given theoretical assumptions highlighting less beneficial interactions with significant others in the development

of negative self-image and emotion dysregulation, there is a risk of placing unnecessary blame on parents. Although social interactions undoubtedly are important in socio-emotional development (e.g., Thompson, 2019), there is a multitude of factors that influence these interactions (e.g., shared genetic vulnerabilities, economic constraints, cultural factors), and psychiatric disorders are not causal consequences of potential flaws in childhood social experiences (c.f., Schaumberg et al., 2017). Therefore, developmental precursors are highly speculative, and it may be beneficial to only raise such issues if patients themselves bring them up with the purpose of enhancing mentalization and understanding of how one's history may influence current functioning. Relatedly, the concepts examined here place an emphasis on dysfunctions and disabilities. Without caution, this can be experienced as research that mainly "blames" the patients by highlighting their shortcomings, instead of for example framing their way of functioning as strongly influenced by the environment or as potentially exaggerated by the illness. Research could also profitably focus more on patients' strengths.

Even so, as the results indicate considerable associations between emotion dysregulation, self-image, and ED psychopathology, not bringing these issues up in research and treatment may present an even greater risk of invalidating inner experiences of what it is like psychologically to have an ED. Apart from the specific clinical implications discussed above, at a very basic level, this thesis indicates that the Swedish DERS seem to capture meaningful patterns in relation to both self-image and ED symptoms, suggesting that the DERS is appropriate and meaningful to use in Swedish ED settings. The SASB has been used in Swedish ED settings for decades and results in this thesis strengthen its importance as a measure that seems to capture a central aspect of EDs, even when other traits (i.e., here, emotion dysregulation) are taken into account. Therefore, this thesis also encourages continued use of the SASB.

There is also always a risk of new findings inspiring radically new models, which may overshadow what is already working well enough within current practices. This thesis did not specify for which patients it may be particularly important to address emotion dysregulation and self-image in order to improve outcome, and it did not examine how clinicians should work with these themes. That is, does it take specific therapeutic interventions that directly targets emotion dysregulation through self-image, or could it be sufficient to explore these themes within standard treatment approaches? Relatedly, may it be easier to work with these themes through formal methods (e.g., CBT, IPT, psychodynamic therapies), or can any treatment contact address such themes? Are new treatment models necessary? These are all avenues for future research. However, in a way, the DERS and the SASB capture features evident and addressable in many different settings and interpersonal interactions. Therefore, such themes may potentially be addressed in various different treatment contacts and settings. Until more detailed answers are available, focusing on emotion dysregulation and promoting better self-image in a wide array of standard ED treatment approaches is most likely beneficial, with the potential of improving ED outcomes.

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